

# H-53 Sea Stallion

in action



Don Greer



Aircraft Number 174  
squadron/signal publications



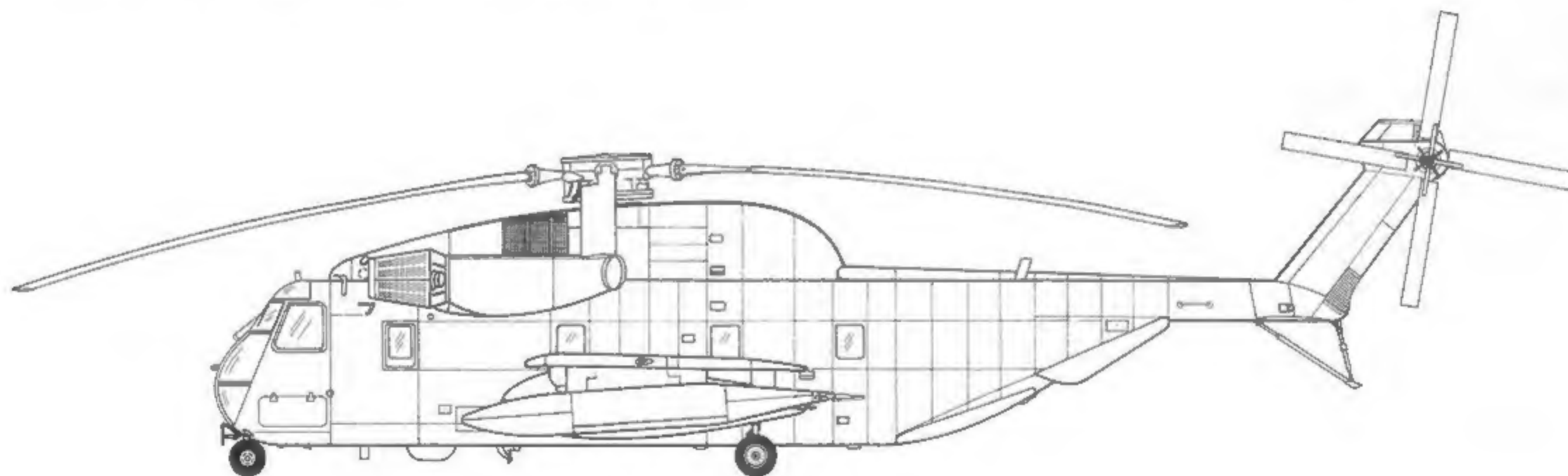
# **H-53 Sea Stallion**

**in action**

**By C.M. Reed**

**Color by Don Greer and Andrew Probert**

**Illustrated by Ernesto Cumpian**



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# Introduction

The most powerful helicopter in service with the US military, the Sikorsky H-53 has served with distinction with the Marine Corps, Air Force, and Navy since its first flight in 1964. Every major conflict since Vietnam has seen H-53s involved in some way, either bringing men and equipment into trouble spots, rescuing downed aircrews, evacuating civilians, or sweeping for mines. While older examples have been retired, the newer CH-53E and MH-53E models, together with the long serving and often-rebuilt Air Force PAVE LOWs, will continue in service for years to come.

The genus of all Sikorsky helicopters dates back to the period 1908-1910, when the young Russian aviation pioneer Igor Sikorsky attempted to make a radical leap in aviation design by creating one of the first helicopters. He built a pair of rotary-winged machines; however, despite being a talented designer, Sikorsky did not achieve success with these aircraft. Sufficient experience in aerodynamic knowledge and aircraft technology was not available to support such a bold leap forward. Sikorsky was to remain in the aeronautical field and later designed a series of fixed-wing aircraft, which were quite notable in their own right. His first 'giant' was the *Russki Vitaz* (Russian Knight)/*Le Grand*, the world's first four-engined aircraft, which flew in 1913. This early airliner, later written off in a ground accident, led to the *Il'yu Muromets*, a heavy bomber which saw service with the Czar's air force in World War I.

In 1918, Sikorsky fled Russia ahead of the Bolsheviks (Communists), eventually settling in the United States one year later. He established the Sikorsky Aero Engineering Corporation on Long Island, New York in 1923. Six years later, the firm was renamed Sikorsky Aviation Corporation and moved to Stratford, Connecticut. Sikorsky's fledgling business initially concentrated on building large flying boats for commercial operations. The organization would eventually become part of United Aircraft Corporation, later United Technologies.

By the 1930s, Sikorsky actively engaged again in his decades-long quest for rotary winged flight. While others were flying gyrocopters (autogiros) and designs using twin main rotors for stability, Sikorsky refined the concept of a helicopter with a small vertically mounted tail rotor.

This rotor canceled out the torque produced by the single main rotor and also served to control the craft. The designer's faith in this configuration was demonstrated on 14 September 1939, when Sikorsky himself took the **VS-300** demonstrator aloft – although it remained fastened to the ground by a safety tether. The VS-300 was widely recognized as setting the stage for the modern helicopter and led to the wartime **R-4** and **R-5** series.

During the late 1940s and early 1950s – while the helicopter began to be accepted as a viable military tool – the US Marine Corps (USMC) investigated using rotary-winged aircraft to supplement their traditional amphibious assault craft. Not only were helicopters far faster than landing craft, they could also fly well inland to land troops in strategic locations and continue to support units far from landing ships or conventional airfields. Among the first really effective military helicopters was Sikorsky's **S-55**, which saw service with the Marines as the **HR4S** during the Korean War. Some examples survived long enough to be redesignated **CH-19Es** in 1962.

The early helicopters were limited in terms of payload and range, and more capable types were needed to haul the large and bulky items necessary for prolonged combat operations. A 1950 USMC requirement for a larger, more powerful helicopter was met by procuring the Sikorsky **S-56**, which would be the Western world's largest helicopter in regular service for a time.

The S-56 had two 1900 horsepower (HP) Pratt & Whitney R-2800 piston engines housed in outboard nacelles, which kept the fuselage clear for payload. A 'clamshell' nose was fitted to facilitate loading and unloading. The S-56, designated **HR2S** by the US Navy and Marines, could carry over 25 troops or 5300 lbs (2409 kg) of cargo.

The HR2S began flight testing on 18 December 1953 and 55 production machines entered USMC service. The US Navy modified a pair (BuNos 141646/7) into HR2S-1W airborne early warning aircraft equipped with APS-20E search radars and the US Army bought 94 of the similar **CH-37 Mojave**. An HR2S set two payload-to-altitude records and one speed record in November of 1956.

Together with the smaller **S-58 (HUS Seahorse)**, the HR2S helped the USMC develop a true vertical assault capability, flying from straight-deck **ESSEX**-class aircraft carriers which had been redesignated **BOXER**-class helicopter landing ships. These operations paved the way for the later purpose-built **GUADALCANAL**-class LPHs and today's **TARAWA** and **WASP**-class LHAs and LHDs. Under the 1962 USN/USMC aircraft redesignation scheme, surviving Marine HR2S aircraft became **CH-37Cs**. Some of these helicopters brought Marines from the **USS BOXER (LPH-4)** ashore during the intervention in the Dominican Republic in 1965.

The Sikorsky **CH-37 Mojave** (HR2S to the Navy and Marines) was the Western world's largest helicopter when it entered service in July of 1956. The 'clamshell' nose doors facilitated loading and unloading of troops and cargo. Pods flanking the main rotor hub housed the CH-37's two 1900 HP Pratt & Whitney R-2800 piston engines and main landing gear units. (John L. Vandyke)



Throughout the early Vietnam years, both Marine and Navy 'Deuces' flew heavy lift missions, retrieving disabled aircraft and moving artillery pieces, among other items. By 1967, the US armed forces phased out the CH-37s as newer turbine-powered helicopters became available.

Another heavy-lift helicopter from Sikorsky, the **S-64 Skycrane**, never flew in Marine colors; however, it helped introduce the world to large gas turbine-powered helicopters. Sikorsky 'flying crane' development started in the late 1950s, with the company's officially retired founder making a major contribution to the program. A crane helicopter, without a conventional fuselage, was thought to be particularly versatile, being able to pick up and drop off interchangeable pods. These pods would be rigged for such roles as troop transport, aeromedical evacuation, minesweeping, and anti-submarine warfare. Additionally, bulky payloads such as missiles, vehicles, and even small prefabricated buildings could be moved with ease.

Sikorsky's S-60 crane demonstrator, first flown on 25 March 1959, was recognizable as an S-56 derivative, but lacked the earlier helicopter's fuselage. The crew compartment, engines, rotors and landing gear were affixed to a central keel. The S-60 did much to prove the crane concept, but was strictly a demonstrator – Sikorsky envisioned a larger, more powerful production machine powered by turboshaft engines. In April of 1961, the S-60 was destroyed during testing of new control systems, although both crewmembers escaped.

Sikorsky's production Skycrane was the **S-64**, first flown on 9 May 1962. Power for this monster came from a pair of 4500 shaft horsepower (shp) Pratt & Whitney JFTD-12 turboshaft engines. Well-proven S-56 dynamic components were used as with the S-60; however, there were some alterations. Whereas the Mojave had a five-bladed main rotor, the Skycrane used a six-bladed unit to reduce blade loading and lower vibration. Sikorsky also envisioned future compound versions with wing-mounted propellers to offload the rotors, although such plans

The Sikorsky CH-54 Tarhe's configuration allowed the carriage of interchangeable pods and outsized cargoes. CH-54s remained in US Army National Guard service until the late 1980s. Although not a direct derivative, the CH-53 Sea Stallion uses some dynamic components – engines, transmissions, and rotor hubs – developed for the Tarhe. (via Joe E. Michaels)

never came to fruition. Three prototype Skycranes were built and West Germany evaluated two of these. Although this early German interest helped get the program off the ground, no overseas orders were placed; however, the US Army soon began procuring a military version designated the **CH-54 Tarhe**.

CH-54s were deployed to Vietnam to replace Army CH-37s and soon proved capable of hauling loads that no other helicopter could, retrieving aircraft up to the size of stripped-down C-123s. The CH-54's payload capacity was 67 troops, 48 stretchers, or 22,890 pounds (10,404 kg) of cargo. The Tarhe was even used in the bomber role, dropping old US Air Force five-ton (4545 kg) bombs to create landing zones for smaller helicopters. The CH-54's capabilities were acknowledged; however, so was its high cost. The smaller but cheaper Boeing-Vertol **CH-47 Chinook** was able to carry out most heavy-lift missions. Additionally, the interchangeable pod concept for the CH-54 never caught on, leaving the Tarhe a specialized type suitable for only the heaviest of lifting jobs. Likewise, only a small number of commercial S-64 Skycranes were built, although these also carried out notable flights, especially in support of heavy construction projects. There had been interest in using the S-64 as a commuter liner hauling passenger pods (a 20-passenger pod had been proposed for the S-60) and although one aircraft did fly with a prototype pod, no further use was made of this idea.

The Army later ordered 37 improved CH-54Bs with 4800 shp Pratt & Whitney T73-700 engines and high-lift rotors, giving an improved payload capacity of 27,000 pounds (12,272 kg). In October of 1971, CH-54B crews set three world records for payload-to-altitude, and the next month a Tarhe achieved 36,122 feet (11,002 m) for a new altitude record. Retired from Army National Guard service by the early 1990s, a number of former military Tarhes have been put to work commercially.

The CH-54 Tarhe's two Pratt & Whitney T73 turboshaft engines provided more power than the early T64s of the CH-53A; however, the CH-54 is less powerful than the three-engined CH-53E Super Stallion. The S-64 Skycrane civilian versions of the Tarhe are still used for construction work and other commercial tasks. (via Joe E. Michaels)



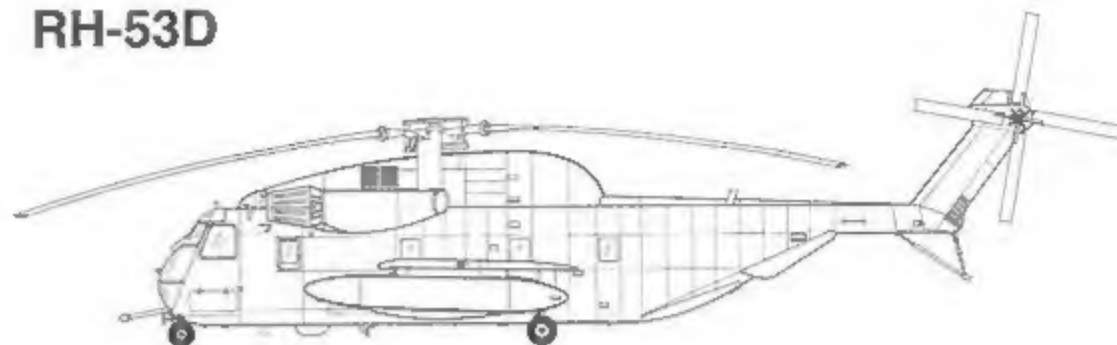


# Development

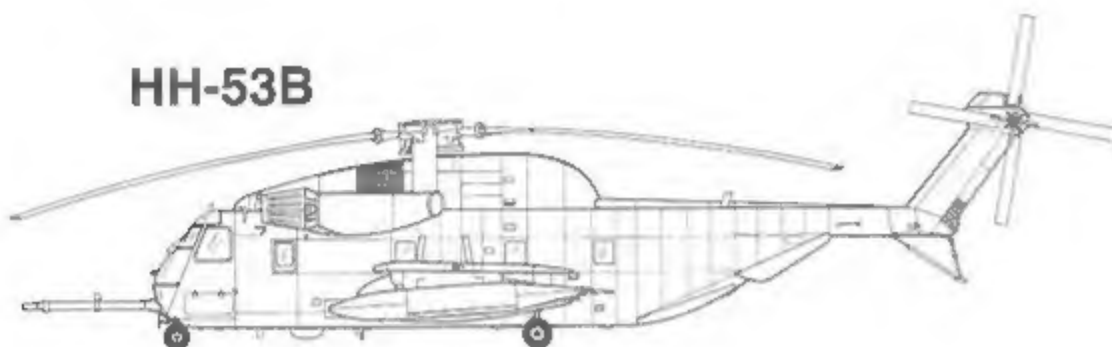
CH-53A (Early)



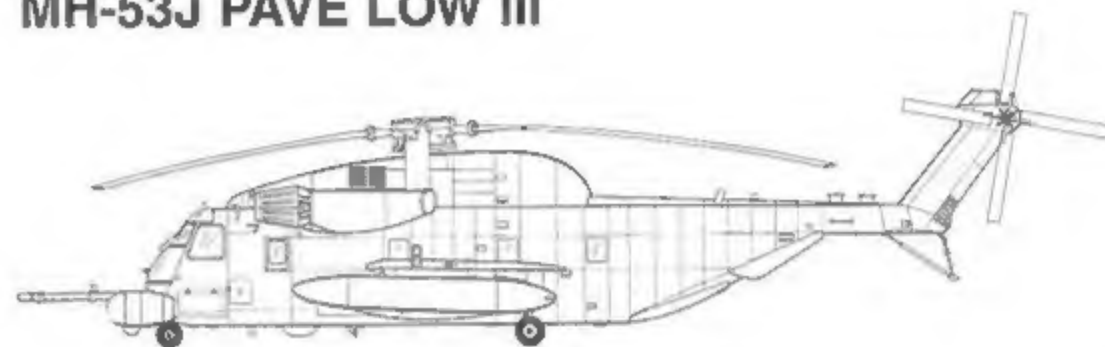
RH-53D



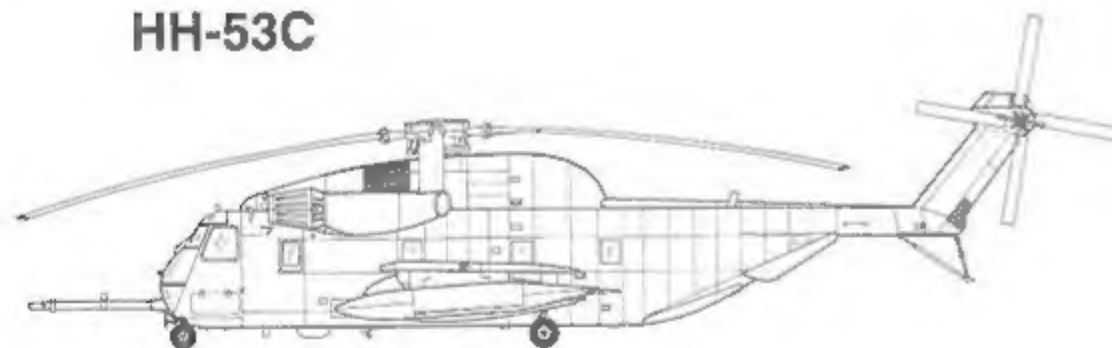
HH-53B



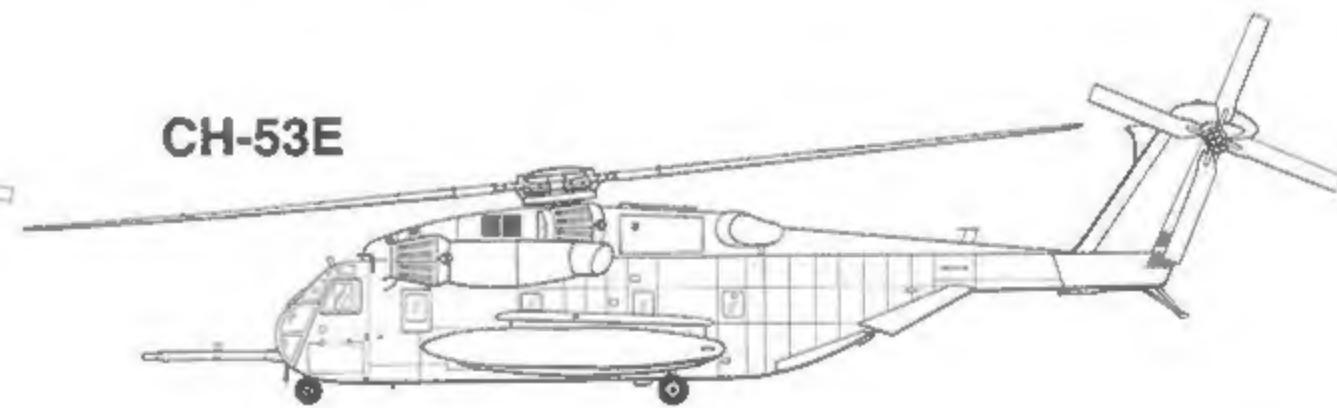
MH-53J PAVE LOW III



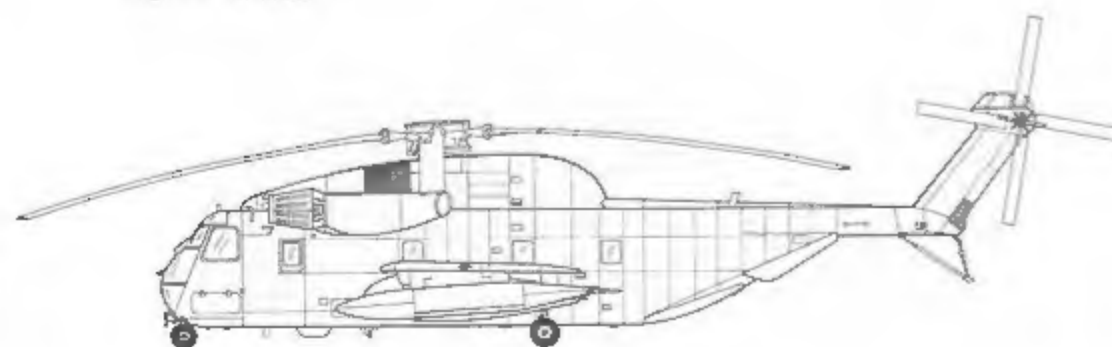
HH-53C



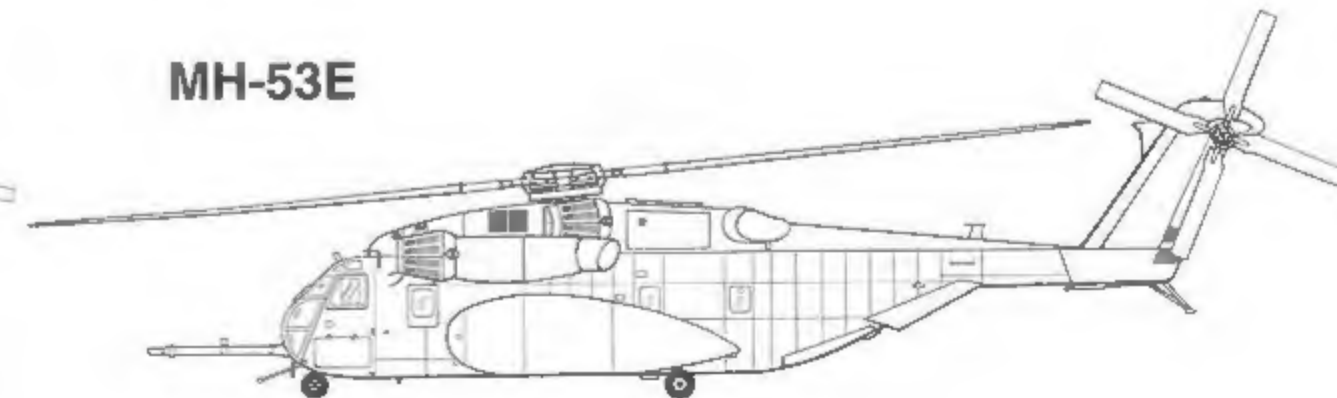
CH-53E



CH-53D



MH-53E



# CH-53A Sea Stallion

The genesis of the **CH-53 Sea Stallion** dates back to the Marine Helicopter Experimental requirement of the early 1960s, which called for a large transport helicopter to replace the piston-engined HR2S/CH-37. In 1962, Sikorsky won the contract with the **S-65**, a design powered by two 2850 SHP General Electric T64-GE-6 turboshaft engines. The new S-65 combined some CH-37 and CH-54 systems with a new fuselage, which could accommodate large pieces of cargo internally. The S-65's fuselage was 67 feet 2 inches (20.5 m) in length and the height was 17 feet 1.5 inches (5.2 m).

Before construction of actual flyable airframes began, Sikorsky built a full-scale metal mock-up (with only three main rotors) to verify design features. Two flying YCH-53A prototypes were built at Stratford, Connecticut, the number two aircraft starting the flight test program on 14 October 1964, before being shown to the public the following month. These early machines were followed by 139 production CH-53As.

The S-65 received the military designation **CH-53A Sea Stallion** and was flown by a crew of three: pilot, co-pilot, and crew chief. The fuselage was optimized to carry four tons (3.6 MT) of cargo, including such loads as a 105mm howitzer, Honest John battlefield SSM (Surface to Surface Missile), or a HAWK mobile SAM (Surface to Air Missile) system. The S-65's fuselage clearly shows the influence of the earlier **S-61/H-3 Sea King**, although a rear ramp/cargo door was added for loading, much like the earlier S-61R/CH-3E. Fixed strakes on the CH-53A's rear fuselage smooth the airflow in this area. The internal cargo area was 30 feet (9 m) long and 7.5 feet (2.3 m) wide, and equipped with internal winches to ease cargo handling.

The Sea Stallion design has the engine nacelles located abreast of the transmission fairing atop the fuselage. Also located atop this fairing is the aircraft's auxiliary power unit (APU), which provides power to start the engines and operate electrical systems on the ground. The engine intakes were retrofitted with Engine Air Particle Separator (EAPS) filters to protect the engines, although this installation slightly reduces engine power. The main rotor is a six-bladed type with a diameter of 72 feet 3 inches (22 m) and is tilted 5° forward for better forward speed characteristics. For shipboard stowage, the blades can be folded to the aft position. The four-bladed tail rotor is 16 feet (4.8 m) in diameter and is mounted on a folding tail pylon. A retractable tail bumper prevents the CH-53A's tail rotor from striking the ground.

The Sea Stallion rides on a retracting tricycle landing gear, with each gear having two wheels. The main gear units are housed in the fuselage sponsons, which also contain the aircraft's fuel cells. The CH-53A has a total internal fuel capacity of 1050 gallons (3990 L). Although not designed for routine amphibious use, the Sea Stallion's sponsons and watertight lower hull allow for emergency water landings. Up to five 300 gallon (1140 L) auxiliary fuel tanks can be carried in the cabin for a long-range self-deployment capability.

HMH-463 was the first USMC Sea Stallion unit, taking a quartet of aircraft to Vietnam in January of 1967, after having converted to the type the previous fall. By the spring of 1967, increasing numbers of CH-53As were 'in-country,' replacing CH-37 Mojaves.

One major role of the Sea Stallion in Vietnam was the recovery of crashed US aircraft. The earlier CH-37 had also carried out such missions, but in the 'hot and high' environment of Southeast Asia, the Mojave's performance – even when stripped of much equipment – was often marginal. Repair of downed machines was practical in many cases, especially those involving helicopters, and in others it was desirable to bring back the wreckage in order to salvage as many components as possible. With their great lifting power, CH-53s were able to



The CH-53 Sea Stallion was created around the same time that the CH-54 Tarhe was taking shape. Not surprisingly, Sikorsky designers used similar rotors and transmissions on both aircraft; however, the resemblance ended there. The Sea Stallion had General Electric T-64 engines, a conventional fuselage for naval basing, and was much faster than the Tarhe. (Nick Waters III)

CH-53A Sea Stallion QM-400 (BuNo 154867) was assigned to HMH-777, a US Marine Corps Reserve (USMCR) squadron based at NAS Dallas, Texas during the 1970s. Marine Sea Stallions were originally painted overall Field Green (FS34097) with high visibility markings, including White lettering. A red mesh intake protector has been placed on the port engine intake to prevent Foreign Object Damage (FOD) during maintenance. (via Joe E. Michaels)





The CH-53A was not originally equipped with External Air Particle Separators (EAPS), nor were they capable of carrying external fuel tanks. Both EAPS and external tanks became standard items in later CH-53s. USMC squadron HMM-772 at NAS Willow Grove, Pennsylvania flew MT/404 during the 1970s. (via Joe E. Michaels)

The Auxiliary Power Unit (APU) access hatch on the cabin roof is flipped forward on CH-53A BuNo 153706, assigned to HMT-301 at MCAS Tustin, California during the early 1980s. The APU provided ground power for the aircraft, including engine start. HMT-301 trained Marine Sea Stallion crews until their CH-53As were retired in the early 1990s. (via Joe E. Michaels/JEM Aviation Slides)



carry most rotary-winged aircraft, from Hueys to Sea Knights, and stripped-down fixed-wing aircraft were also retrieved. Another benefit of the CH-53's lifting capacity was the ability to transport heavy loads of artillery, ammunition, and construction equipment to isolated firebases, where roads were non-existent or controlled by the Viet Cong (VC). Keeping wrecks out of the hands of the VC was also necessary, since the guerrillas could use the wrecked airframes for raw materials.

The Sea Stallion was originally designed to be unarmed; however, CH-53As deployed to South Vietnam needed self-defense capability and were armed with two 7.62MM M60 machine guns, one in each forward hatch. These weapons were operated by the crew chief.

Sea Stallions had been in Vietnam for a year by the time of the siege of the Marine base at Khe Sanh in 1968, which North Vietnamese Army (NVA) General Vo Nguyen Giap intended to seize, as he did the French bastion at Dien Bien Phu in 1954. American airpower was a key element in preventing the NVA from accomplishing their goal, with a high-priority airlift operation bringing in supplies while airstrikes pummeled the North Vietnamese encircling the base. While USAF and Marine C-130s could bring in heavier payloads than helicopters, the large fixed-wing transports suffered from murderous fire while unloading at Khe Sanh. There were periods when helicopters and smaller C-123s were the only aircraft allowed to land at the base. Flying through a hailstorm of fire to reach Khe Sanh and then make it back out, the helicopter crews were no less in danger – evidenced by the loss of CH-53A BuNo 153283 in February of 1968.

Even while the Khe Sanh operation was underway, the CH-53A was showing off its capabilities stateside. In February of 1968, a Sea Stallion lifted a payload of 28,500 lbs (12,954 kg), equivalent to the weight of three unloaded A-4E Skyhawks. In 1968, the Naval Air Systems Command (NASC) also conducted loop and roll tests with a Stallion flown by two pilots from NASC and Sikorsky. For this test, the aircraft's weight was restricted to 27,000 lbs.

CH-53As continued to serve the USMC well into the 1980s, although the influx of newer CH-53Es gradually sent the older Sea Stallions to second-line training units. These aircraft eventually arrived at the AMARC (Aerospace Maintenance and Regeneration Center) 'bone-yard' at Davis-Monthan Air Force Base, Arizona. By 1992, the last Marine CH-53As were retired, although a few A-models remained in USAF service as TH-53A trainers. Only 29 CH-53As remained in storage at AMARC as of 1 May 2000, several others having been preserved at various locations in the US.

## RH-53A

The US Marine Corps (USMC) transferred 15 CH-53As to US Navy (USN) control as Airborne Mine Countermeasures (AMCM) aircraft, redesignated RH-53A. Mine-spotting missions using helicopters had first been flown during the Korean War and, by the early 1960s, there was an effort to provide the fleet with helicopters capable of both detecting and sweeping mines. AMCM aircraft would provide better mobility and crew safety than existing minesweeping ships. Nine RH-3 Sea King conversions were used for early countermeasures test work, but it was recognized a more powerful aircraft was needed for towing minesweeping sleds. These sleds detonate mines by duplicating the acoustic and magnetic signatures of ships.

An interim solution was the transfer of the Sea Stallions to equip Helicopter Mine Countermeasures Squadron (HM)-12 at Naval Air Station (NAS) Norfolk, Virginia. This unit

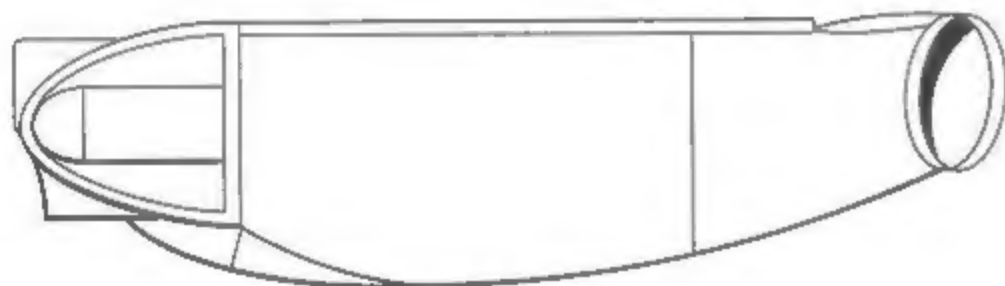


formerly existed as a detachment of Helicopter Transport Squadron (HC)-6. HM-12's first operational test was the clearing of North Vietnam's harbors of US mines that had been dropped as part of Operation POCKET MONEY in 1972. This sweeping was mandated by the terms of the cease-fire agreement signed in January of 1973, and the following month Operation END SWEEP was launched. Flying from Task Force 78 ships in the Gulf of Tonkin, HM-12 crews – supported by Marine Sea Stallions – had the unusual task of assisting a recent enemy by removing American weapons.

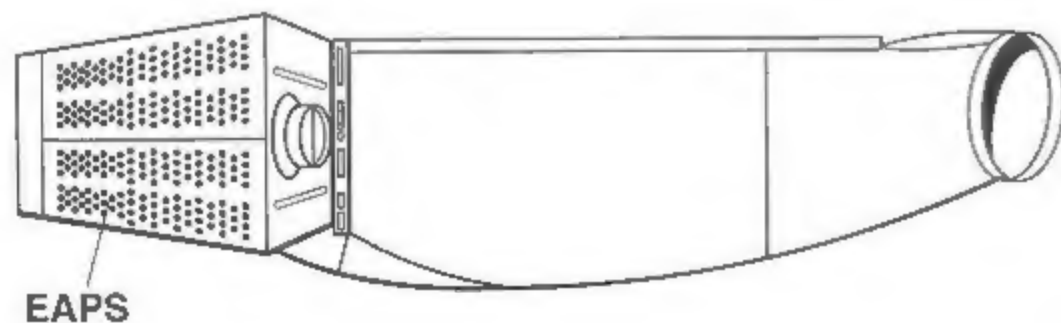
The sophisticated US mines had been designed to inert themselves after a certain period of time had passed, and there was only one instance of a mine detonating during the operation. Two Stallions were lost in accidents during END SWEEP, although both crews were rescued. These crashes led the USN to refit the aircraft with tail rotor pitch links built for installation on Army CH-54s. The pitch links mounted on the tail rotor hub controlled the tail rotor blades' pitch lateral (sideways) control of the helicopter. END SWEEP ceased in late July of 1973, and the RH-53As were phased out when the new purpose-built RH-53Ds became available in 1973. The RH-53A was never exported.

## CH-53 Engine Nacelles

### Original CH-53 Nacelle



### CH-53A Nacelle Retrofitted with EAPS (Engine Air Particle Separator)



Many USMC Sea Stallions received a tri-color camouflage scheme during the early 1980s. This scheme consisted of Blue Gray (FS35237), Black (FS37038), and Marine Green (FS34095), with markings in Black or Marine Green. CH-53A MS/486 was assigned to HMH-772 at NAS Willow Grove. This aircraft has been retrofitted with EAPS air filters on the engine intakes. (via Joe E. Michaels)

This hovering HMH-772 CH-53A has extended its landing gear and tail skid. The skid prevented the tail rotor from striking the ground during low level flight. The CH-53A was among the world's most powerful helicopters in its day. The Sea Stallion was the largest gas-turbine powered helicopter to serve in the USMC and – on a much smaller scale – the US Navy. The aging CH-53As could not carry many heavier items by the 1980s, resulting in their gradual withdrawal from service. (via Joe E. Michaels)





(Above Left) HMH-772 was a major user of the CH-53A during its last years of service. The Squadron was assigned to the 4th Marine Aircraft Wing (Reserve). Markings on the tri-color camouflage were Black on Marine Green and Blue Gray and Marine Green on Black. (via Joe E. Michaels)

(Above) The Sea Stallion's tail folds to starboard, reducing the space needed for storage – an especially useful capability on the cramped flight and hangar decks of helicopter carriers. This CH-53A (BuNo 153300) appears in the low visibility Black markings adopted by USMC fighters during the late 1970s. (via Joe E. Michaels)



(Left) The cargo loading ramp of this HMH-363 CH-53A (BuNo 154870) has been lowered. This ramp and the inward folding upper cargo door form the aft fuselage section. The two strakes flanking the doorway smooth the airflow while the ramp is open. The troop seats along the cargo hold sides could accommodate 38 troops; later Sea Stallions could hold 55 troops in a rearranged seating plan. The main rotor blades folded for storage aboard ship. (T. Kerr)





The USMC transferred 15 CH-53As to the US Navy for Airborne Mine Countermeasures (AMCM) work; however, most Marine Sea Stallions could tow AMCM equipment when necessary. This USMC CH-53A is towing the Mk 103 device, which severs mine mooring tethers to allow the surfaced mines to be destroyed by gunfire. Minesweeping H-53s are equipped with two side-mounted .50 caliber (12.7mm) machine guns for detonating surfaced mines. (USN)

## H-53 Sea Stallion Colors - US Marines & Navy

Field Green (FS34097) – 1960s to 1980s

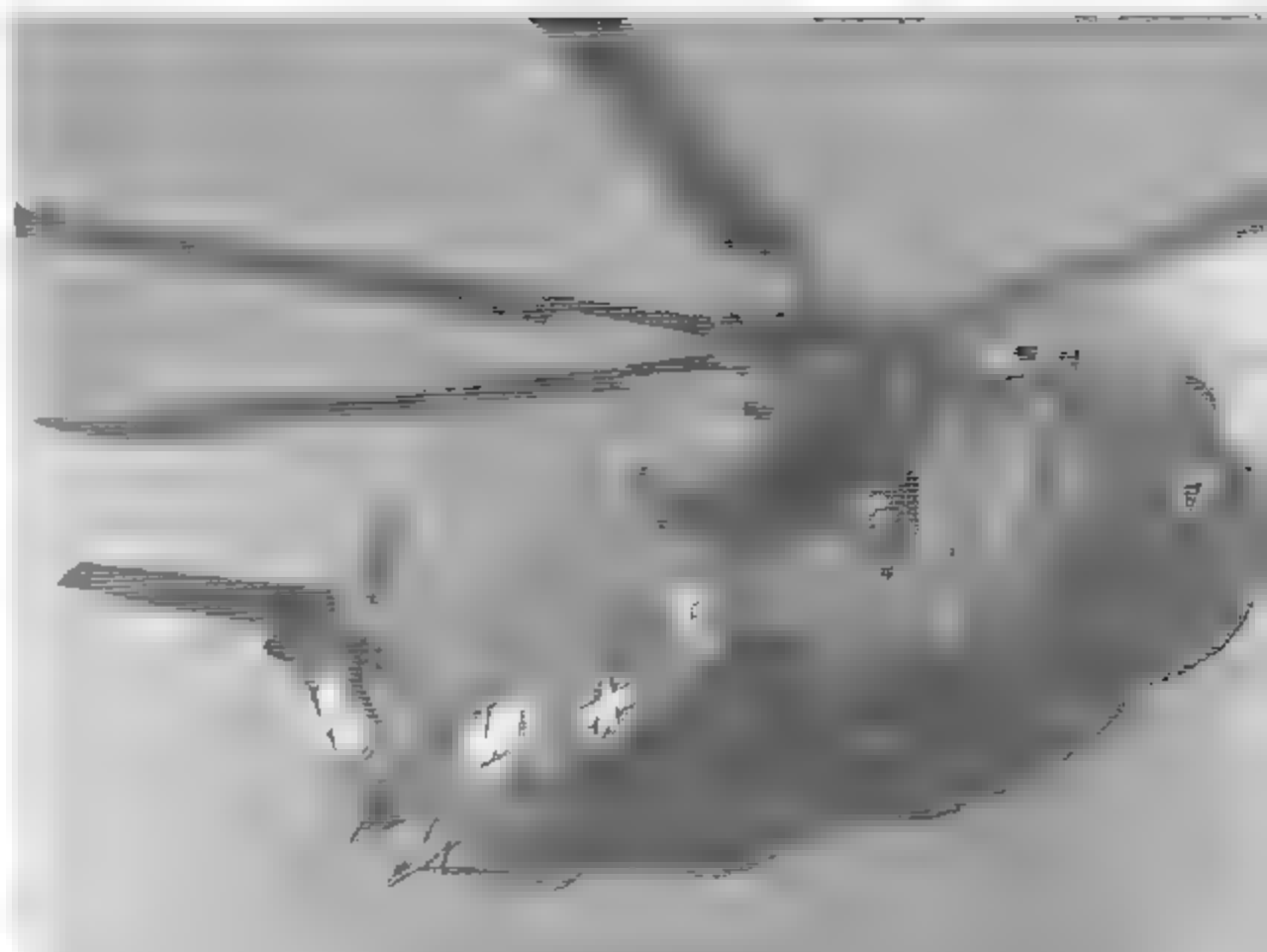
Blue Gray (FS35237)/Black (FS37038)/Marine Green (FS34095) – 1980s to 1990s

Light Ghost Gray (FS36375) – 1990s to present

Gloss Engine Gray (FS16081) – 1960s to 1980s

Flat Engine Gray (FS36081) – 1980s to present

An HM-12 RH-53A, DH/17, prepares to pick up the towline of an Edo Mk 105 sled at the start of a mission. The Mk 105 sled measures 27 feet (8.1 m) in length and 13 feet (3.9 m) in width, with a weight of approximately 6000 pounds (2727 kg). Sea Stallions usually pick up the sleds from support ships, since the units are too large for the helicopter to carry internally. The Mk 105 sled, employed to detonate magnetic mines, cruises over the water on twin hydrofoil-equipped floats. The sled's turbine generator can be topped off from the RH-53's fuel tanks, if necessary. (USN)



# HH-53B 'Super Jolly Green Giant'

Rescue work was one of the earliest roles for military helicopters, and by the time of the Korean War, Sikorsky helicopters were in regular use picking up UN pilots shot down behind enemy lines. The existence of rotary-winged aircraft finally gave pilots a realistic chance at being rescued and long-range turbine-powered helicopters optimized for combat rescue work were appearing by the 1960s.

As the air war over North Vietnam grew more costly in lives, Sikorsky CH-3 transport helicopters were pressed into service to rescue pilots forced to eject from their crippled aircraft. Redesignated HH-3Es, these conversions used many features which would later appear on the HH-53B, including a rescue hoist with a jungle penetrator and a refueling probe for tanking from drogue-equipped Lockheed HC-130s. The HH-3E 'Jolly Green Giants' were soon making flights into North Vietnamese airspace, homing in on distress signals, and hovering only long enough to make their pickups, while Douglas A-1 'Sandies' laid down covering fire. Although the HH-3Es rescued many US personnel, a faster and longer-legged aircraft was needed for missions deep within North Vietnam.

In its search for a Combat Aircrew Rescue Aircraft (CARA), the Air Force went so far as to investigate such advanced concepts as stowed-rotor V/STOL (Vertical/Short Takeoff and Landing) aircraft, but it was clear a new SAR (Search and Rescue) helicopter was needed in the short term. The CH-53 had the speed, range, and internal capacity for the mission, leading

The HH-53B was the first of the USAF's 'Super Jollies,' developed for combat search and rescue service. Although more powerful than the Kaman HH-43 Huskie and the Sikorsky CH/HH-3 'Jolly Green Giant,' the HH-53B was surpassed by the later HH-53C. Surviving HH-53Bs were converted to PAVE LOW III standard and served into the 1990s. (Sikorsky)

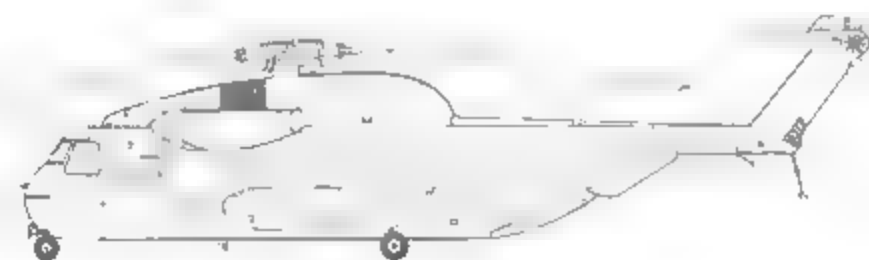
the Air Force to fly a pair of borrowed Marine CH-53As in USAF markings as part of an evaluation program.

A CH-53A derivative was indeed chosen to supplement the HH-3E, and by March 1967 the first HH-53B 'Super Jolly' was flying. In order to counter small arms fire, approximately 2500 lbs (1136 kg) of armor was applied to protect the crew and vital systems. A refueling probe was added to the starboard side of the nose, and to further increase endurance 650-gallon (2470 L) external tanks were fitted to the sponsons. To provide covering fire against the North Vietnamese Army (NVA) units and armed civilians which tried to beat the Jolly Greens to their pickups, three 7.62mm General Electric M134 Minigun stations were added, one on either side of the forward fuselage and a third in the rear. The basic engine for the model was the 2850 SHP General Electric T64-GE-3, but the more powerful 3925 SHP T-64-GE-7 powerplant was later used.

Only eight of the 15 HH-53Bs ordered were built, the remaining seven helicopters were cancelled by the Air Force. The first HH-53B deployment was in September of 1967, with a pair of aircraft being transported to the Southeast Asian theater aboard the USS CARD (AKV-40), a former escort carrier converted to an aircraft ferry. The Super Jollies were based at Udorn, Thailand, equipping Detachment 2 of the 37th Aerospace Rescue and Recovery Squadron (ARRS).

Rescue packages were standing by when strike packages sorted, since every moment counted when racing into enemy-held territory. When a crew had to eject from a crippled aircraft, automatic beepers would sound on emergency channels, alerting command and rescue forces. Once down over the north, crews had little choice but to hide as best as possible and contact a rescue flight over handheld survival radios, hoping all the while that the HH-53s were faster than the NVA. At times, the North Vietnamese would not try for outright capture, instead laying in wait for a chance to ambush a rescue helicopter. Deceptive messages were also broadcast over the rescue frequencies; thus, specific pre-arranged codes had to be used.

## CH-53A



## HH-53B

Engine Air Particle Separator (EAPS) Filters



Inflight Refueling Probe

External Bracing for Auxiliary Fuel Tank





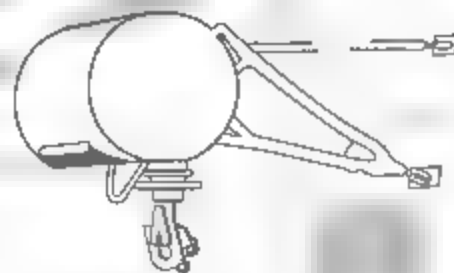
Command of a rescue was the role of the HC 130 'Kingship,' which also carried drogue pods to refuel the helicopters. Douglas A-1 Skyraiders – nicknamed 'Spads' and 'Sandys' – escorted the HH-53s to suppress enemy fire during rescues. During the later stages of the war, Vought A-7D Corsair IIs would replace A-1s in this role.

The first loss of a Super Jolly over Southeast Asia took place on 18 January 1969, when an HH-53B (66-14430) took a hit over Laos while picking up the pilot of a downed Skyraider. The Super Jolly crew and the 'Spad' pilot were safely brought out, but the damaged and unflyable helicopter had to be destroyed on the ground.

The second loss of an HH-53B occurred on 28 January 1970, when a rescue package attempting to pick up an F-105 pilot was jumped by a North Vietnamese MiG-21 'Fishbed.' The MiG-21 pilot hit Super Jolly 66-14434 with an R-3 (AA-2 'Aloft') AAM (Air to Air Missile), destroying the helicopter and killing the entire six-man crew.

One HH-53B was reworked into the prototype PAVE LOW: a conversion aimed at giving the HH-53 force the capability to conduct night/adverse weather rescues. The HH-53B lost its refueling probe in order to accommodate a nose-mounted Norden APQ-141 radar, originally developed for the Lockheed AH-56A Cheyenne attack helicopter. The modified helicopter was the ancestor of today's PAVE LOW III/IV helicopters.

## CH/HH-53 Rescue Hoist



The sight of an Aerospace Rescue and Recovery Service (ARRS) HH-53B was the ticket home for many downed airmen. The rescue hoist above the starboard cabin door can lower a jungle penetrator-equipped line some 250 feet (75 m), although this means the General Electric 7.62mm M134 Minigun at that station could not be used until the rescue was completed. The Gatling-type Minigun was seen as more effective than the 7.62mm M60 machine gun in the Southeast Asian environment, due to the M134's higher rate of fire. (Sikorsky)

Two HH-53Bs fly over a launch complex at Cape Canaveral, Florida. The 'Super Jolies' served as Search and Rescue (SAR) aircraft during the Apollo program and would have been used to retrieve a Command Module (CM) in case of an abort during launch. One of the two CH-53As loaned by the Marines to the USAF as HH-53 demonstrators showed this capacity by lifting an Apollo CM test vehicle. (Sikorsky)



# HH-53C

Whereas the HH-53B had been developed from the basic CH 53 airframe to fill an urgent need in Southeast Asia, the definitive HH-53C model had several improvements suggested by operational use of the earlier Super Jolies. These included uprated 3435 SHP General Electric T-64-GE-7 turboshaft engines, additional armor protection for the flight crew, and improved radios for communication with downed aircrews. The easiest means of telling an HH 53C from its predecessor was by the type of external tank fitted – the Cs having the smaller 450-gallon (1710 L) unit that did not have the extensive bracing necessary for the B-model's larger and heavier 650-gallon (2470 L) tanks. A secondary cargo-carrying capability was enhanced by the installation of a ten ton (9 MT) capacity cargo hook. Sikorsky built 44 HH-53Cs, which began to enter service in the late summer of 1968.

The extreme lengths to which rescue operations would go to retrieve downed Americans is shown by the epic retrieval of Lt Col Icaal Hambleton in April of 1972. Hambleton, an EB-66 Destroyer navigator, was the only member of his crew known to survive after their aircraft (callsign *Bat-21*) was hit by a V-75 Dvina (SA-2 'Guideline') SAM while providing ECM (Electronic Countermeasures) support to B-52s operating near the DMZ (Demilitarized Zone) between North and South Vietnam. Despite landing in the midst of several divisions of North Vietnamese troops, Hambleton managed to stay concealed and in contact with US aircraft overhead. Communist Anti-Aircraft Artillery (AAA) fire was murderous, and initial attempts to reach the airman – a former senior member of SAC (Strategic Air Command) with sensitive

The bulge under the HH-53C's forward fuselage contains the aircraft's Doppler radar, used to measure the helicopter's ground speed and wind-induced drift. The cargo hook mounted under the fuselage gives the Super Jolies' a secondary cargo capacity of up to 20,000 pounds (9091 kg) in the HH-53C. This HH-53C carries 450 gallon external tanks; however, it is not equipped with a refueling probe and EAPS engine inlet filters (Sikorsky)

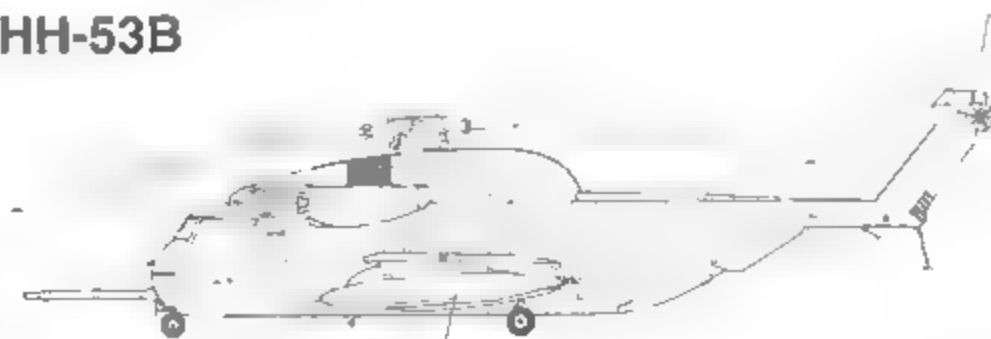
knowledge of war plans – met with disaster. Two Bell UH 1s were shot down and several other helicopters barely made it out of the area. An OV-10 Bronco was downed on 5 April, but the Bronco crew survived – one crewman was captured, while the other was eventually rescued. The next day, luck ran out for the six-man crew of HH-53C (68-10365), callsign *Jolly Green 67*, when their helicopter was hit and went down burning. No one aboard survived. The next day, another OV 10 went down, with one crewman MIA (Missing in Action) and the North Vietnamese apparently killed the other.

Despite the losses, the *Bat-21* rescue proceeded, with directions compiled from reconnaissance photos and correlated to match holes on an imaginary golf course radioed to Hambleton, who could only risk moving by night. Finally, a successful rescue – albeit one under heavy fire – was carried out by a Navy SEAL (Sea, Air, Land) and a Vietnamese Ranger, with Hambleton finally being brought back to friendly territory after more than 11 days on the ground. Remains from the crash of *Jolly Green 67* were finally recovered in the 1990s and were buried in Arlington National Cemetery in November of 1997, more than a quarter-century after the crew's last mission.

The HH-53C's capabilities were also used in a variety of peacetime missions. During Apollo space launches, Super Jolies stood by to act as SAR assets. In the event of a post-launch abort of a space flight, an HH-53 would attempt to lift the jettisoned command module (CM) containing the three astronauts from the ocean following the CM's separation from the main Saturn booster. Such capability had been demonstrated when a CH-53 borrowed from the USMC and flown in Air Force markings had lifted a 'boilerplate' module during tests. The Apollo recovery capability was thankfully never used, although HH-53s did go on to recover drones and film-return capsules from reconnaissance satellites.

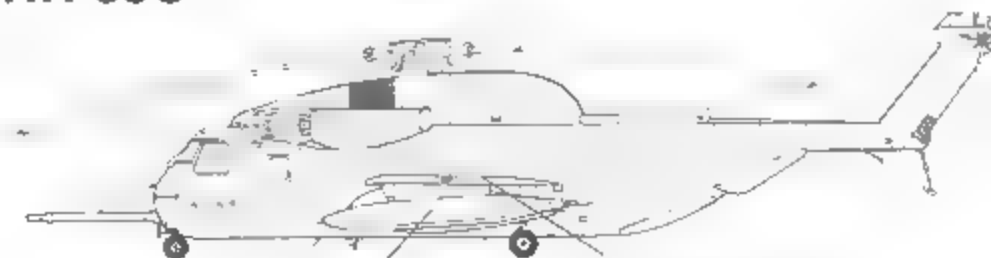
Probably the most disturbing mission ever carried out by HH-53 crews took place in 1979, when Super Jolies were deployed to Guyana after hundreds of Americans living there perished

## HH-53B



650 Gallon External Fuel Tanks

## HH-53C



450 Gallon External Fuel Tanks

No External Bracing for Auxiliary Fuel Tank



during the mass suicide and killing at Jonestown. Guyana had no resources to deal with such a catastrophe and asked the US to remove the bodies. The HH-53s were brought in to lift the rapidly decomposing remains from hot and humid Jonestown to the airport at Georgetown, where C-141s picked them up for transport to Dover Air Force Base (AFB), Delaware.

Rescues of civilians were also carried out, such as the recovery of 35 people from a crippled freighter in the north Atlantic in January of 1989. The rescue mission, flown in bad weather was staged out of Shannon, Ireland using helicopters normally based at RAF Bentwaters Woodbridge in England. HH 53s were also deployed to Naples, Italy to provide SAR cover for the Operation EL DORADO CANYON airstrike on Libya in 1986.

## Operation KINGPIN – Raid on Son Tay

By the early 1970s, the withdrawal of US combat forces from Vietnam was well underway, but this process of 'Vietnamization' did nothing to ease the plight of scores of US prisoners of war (POWs) being held in North Vietnam. Some of these prisoners had been held since the mid-1960s, subject to starvation, disease, and all manner of physical and mental torture. Deep within a hostile country whose culture was vastly different from their own homeland, American POWs had virtually no hope of escape once they had fallen into enemy hands.

Nevertheless, there were weaknesses in the North Vietnamese prison system, most importantly the fact that prisoners were being housed in a number of different facilities in and around

Hanoi by 1970. While this had the detrimental effect of depriving the POWs of much of the mutual support necessary for survival under such conditions, it also meant a force would not have to go all the way into downtown Hanoi itself to rescue prisoners. While bringing out all captive Americans would have necessitated a massive joint forces operation which would never have been politically or militarily practical, rescuing even a few prisoners was highly desirable. Aside from the obligation to rescue American fighting men, such a retrieval would help counter North Vietnamese propaganda, the former captives could attest to – and demonstrate by their own physical condition – how their captors had mistreated them.

Planning for a raid on one of the outlying prisons centered around a long-range heliborne assault from Thailand, using Air Force HH-53s carrying Army Special Forces ('Green Beret') troops under the command of Colonel Arthur 'Bull' Simons. HC-130P COMBAT SHADOW tankers would provide aerial refueling for the helicopters, while MC-130 COMBAT TALONS with extra navigators and equipment would guide the formation. Close support would come in the form of a flight of A-1s, while Air Force F-4s and F-105s guarded against MiG fighter and SAM threats, and Navy aircraft staged mock raids to distract the North Vietnamese.

The camp picked as the target for Operation KINGPIN was Son Tay, located approximately 20 miles (32.2 km) from Hanoi. Despite the camp's proximity to an airfield and a North Vietnamese Army headquarters, it was believed a lightning raid – totally unexpected by the enemy – would have sufficient time to neutralize the guards, secure the POWs, and get out before it could be stopped. Training for the mission took place under great secrecy at Eglin AFB, Florida, using realistic mockups of the camp produced from overhead imagery.

COMBAT SHADOWs, and a few refitted MC-130 COMBAT TALONS. Jet powered tankers such as the KC-135 and KC-10 are too fast to operate with helicopters. (Sikorsky)

An HH-53C equipped with 450 gallon (1710 L) external fuel tanks runs up its engines. This aircraft is equipped with a retractable refueling probe mounted on the starboard side of the nose. Inflight refueling of helicopters is only done by Marine KC-130s, USAF HC-130





HH-53C (73-1647), assigned to the 67th Aerospace Recovery and Rescue Squadron (ARRS), was displayed at the Farnborough, England air show on 7 September 1974. This 'Super Jolly' was the first of six machines ordered in FY 1973 – the final lot of HH-53Cs procured by the USAF. The aircraft was displayed without the usual drop tanks and EAPS engine inlet covers. The Southeast Asia camouflage carried by the HH-53Cs was Dark Green (FS34079), Medium Green (FS34102), and Tan (FS30219) over Light Gray (FS36622). (Robbie Robinson)

The USAF's 6594th Test Group flew HH-53Cs from Hickam AFB, Hawaii in support of the Keyhole reconnaissance satellite program. The aircraft is finished in overall ADC Gray (FS16473) with white upper fuselage. The 'Super Jollies' flew over the Pacific Ocean recovering capsules containing film taken by the satellites. The HH-53's capsule retrieval role ended during the 1980s, with satellites now digitally transmitting imagery to ground stations. (Nicholas J. Waters III)



Operation KINGPIN was launched from Udom, Thailand on 20 November 1971, the five HH-53s (*Apple* flight) being accompanied by a solitary HH-3 (*Banana*) which would be crash landed inside the camp's courtyard to get a team inside the walls as quickly as possible. Proceeding in darkness, the helicopters followed the COMBAT TALON (*Cherry*) into North Vietnam, while another of the special-ops 'Herks' (C-130 Hercules) guided the A-1 flight.

The raiding force arrived at Son Tay without incident, although Simons' own helicopter accidentally came down in a nearby compound greatly resembling Son Tay. Simons' force engaged in a firefight there before joining the main force, which had already made short work of Son Tay's defenders. To their horror, the 'Green Berets' found the cells empty, the POWs probably having been moved due to flooding in the area.

Despite not bringing out any POWs, KINGPIN was nonetheless a success of sorts; in less than one half hour on the ground, the force had decisively engaged an enemy deep within his own territory, suffering only a few non-serious injuries. The HH-3 was intentionally destroyed as planned, but all the HH-53s made it out, one even stopping to pick up a downed F-105 crew in Laos.

## CH-53C

In addition to the rescue-configured Super Jollies, the USAF also bought a dozen similar CH-53Cs in Fiscal Year (FY) 1968 and eight more in FY 1970. The US was engaged in various covert actions in Laos at the time and the Air Force used the CH-53Cs for heavy lift and other missions throughout the region. The 21st Special Operations Squadron (SOS) 'Knives' of the 56th Special Operations Wing (SOW) operated CH-53Cs from Nakhon Phanom, Thailand, replacing loaned USMC CH-53As.

After 1976, the CH-53Cs were assigned to other roles. The 601st Tactical Air Control Wing of the US Air Forces in Europe (USAFE) used them from Sembach AB, West Germany to move mobile radar stations. Two aircraft (68-10927 and 70-1632) were written off during service in Germany, while another pair was used as attrition replacements for lost MH-53Hs. Surviving CH-53Cs were active until the late 1980s, before being rebuilt as MH-53Js.

## MAYAGUEZ

The evacuation and fall of Saigon seemingly marked the end of US military involvement in Southeast Asia. Nevertheless, a greatly scaled back American presence in Thailand would remain until 1976, and these forces would be committed to one final combat action in the spring of 1975. On 12 May, perhaps emboldened by images of the American withdrawals, a Cambodian gunboat seized the US-registered freighter SS MAYAGUEZ, which was operating well into international waters in the Gulf of Thailand. President Gerald R. Ford approved an operation to retake the MAYAGUEZ and put a small Marine force – airlifted by Air Force HH-53s and CH-53Cs from Thailand – on the small island of Koh Tang, where the crew was believed to be held.

Even before the operation began, there were casualties; a CH-53C delivering security police to Udom went down shortly after leaving Nakhon Phanom on 13 May, killing the crew and all others aboard. Once at Udom, the helicopters linked up with Marines brought in from

Ok nawa, the flight to Koh Tang taking off on 14 May. On the way, three CH-53s landed a contingent of Marines aboard the frigate USS HAROLD E. HOLT (FF-1074) to take part in the boarding of the MAYAGUEZ. This part of the operation went off without a hitch, and the abandoned freighter was soon back in US hands and under tow.

Unbeknownst to the raiders, the MAYAGUEZ crew was not on Koh Tang; they were moved to the mainland and subsequently released. Present on the island, however, were several hundred heavily armed Khmer Rouge fighters. The Super Jolies were met with intense AA (Anti-Aircraft) and rocket-propelled grenade fire while approaching the island, and three HH-53s were shot down. Marines who did make it to the LZs (Landing Zones) on the east and west sides of the island found themselves pinned down, outnumbered, and separated. Airpower ranging from fighters to AC-130 gunships, pounded both Koh Tang and bases on the Cambodian mainland, while the remaining helicopter crews struggled to evacuate the Marines and stranded USAF personnel. This was eventually done, although the HH-53s had taken severe damage in doing so. A number of men were missing in action from the Koh Tang action and remain unaccounted for to this day.

## US National Insignia

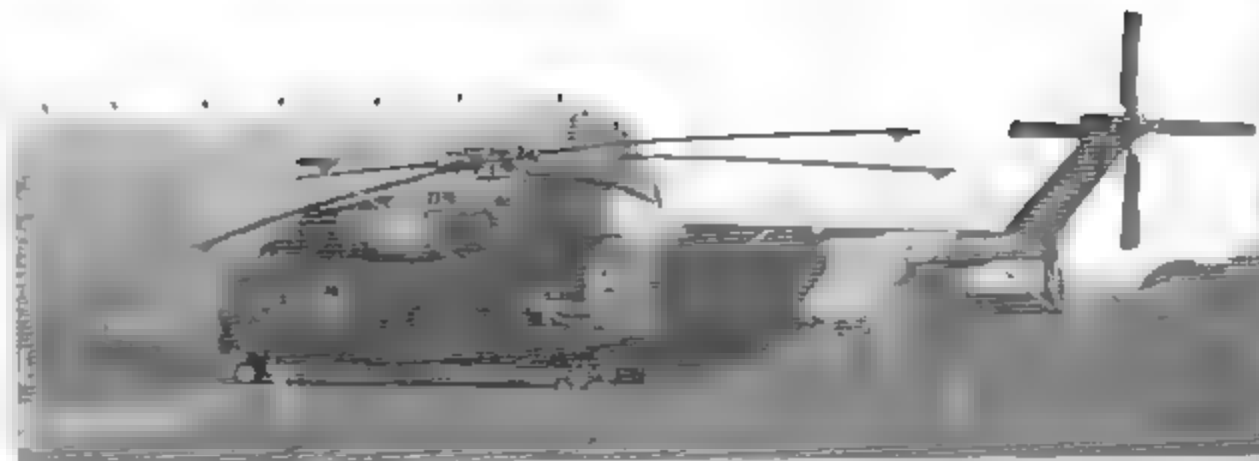


**Standard Full-Color:** White Star on Blue Circle, White and Red Bars with Blue Trim



**Low-Visibility Version:** Black or Gray on Aircraft Camouflage Color

This CH-53C (70-1629) was still painted in Southeast Asia camouflage when parked at RAF Mildenhall, England on 24 May 1981. The aft fuselage serial number was White. This aircraft was assigned to the 601st Tactical Air Support Squadron, 601st Tactical

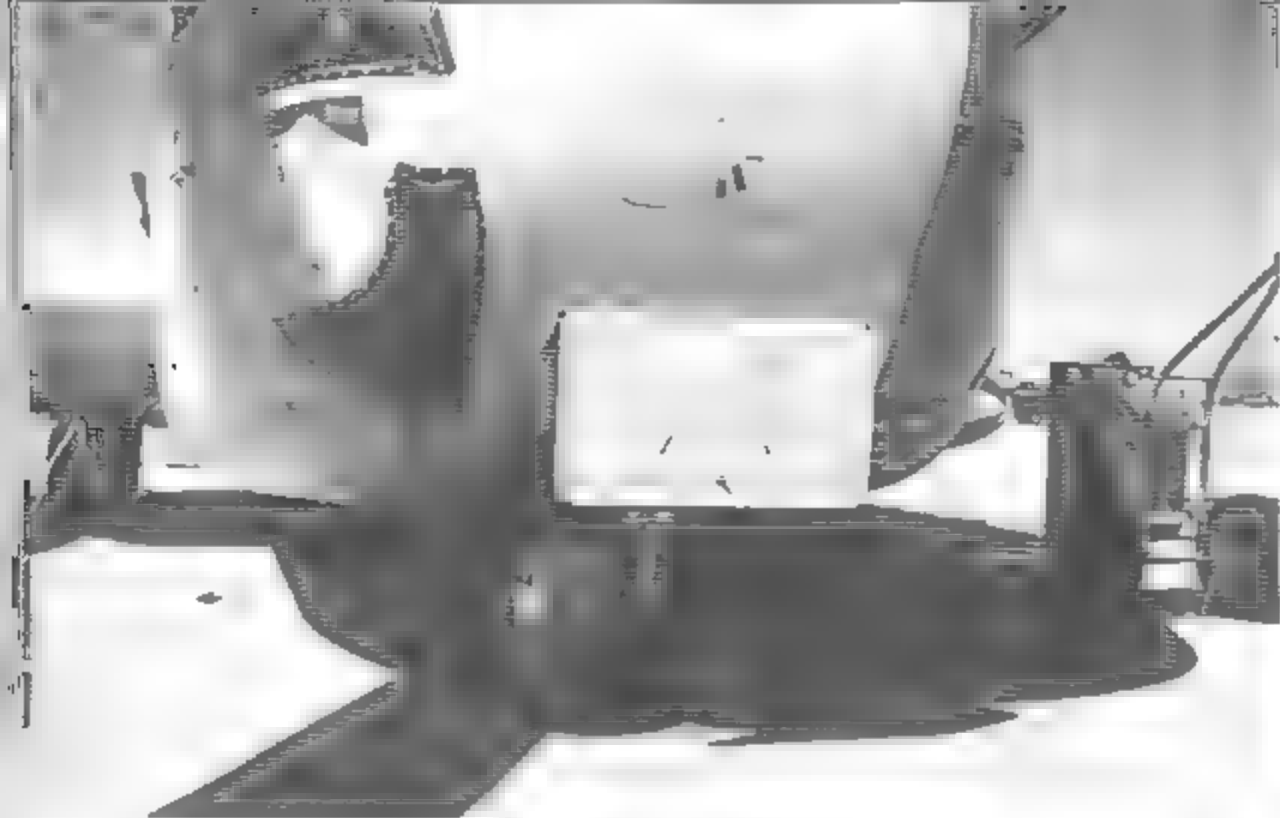


A CH-53C is parked beside a Hardened Aircraft Shelter (HAS) at a USAF base in Europe. USAF aircraft stationed in Europe were housed in the HAS to offer protection against all weapons except a direct hit from a nuclear bomb. The 'Super Jolies' retained their Southeast Asia camouflage scheme until the early 1980s, when it was replaced with the more appropriate European I camouflage during their service in Germany (Robbie Robinson)

Communications Wing (TCW) at Sembach AB, West Germany. The CH-53s provided the 601st TCW with airlift support for the fixed and mobile radars of the Tactical Air Control System (TACS), operated in support of the US Air Forces in Europe. (Robbie Robinson)







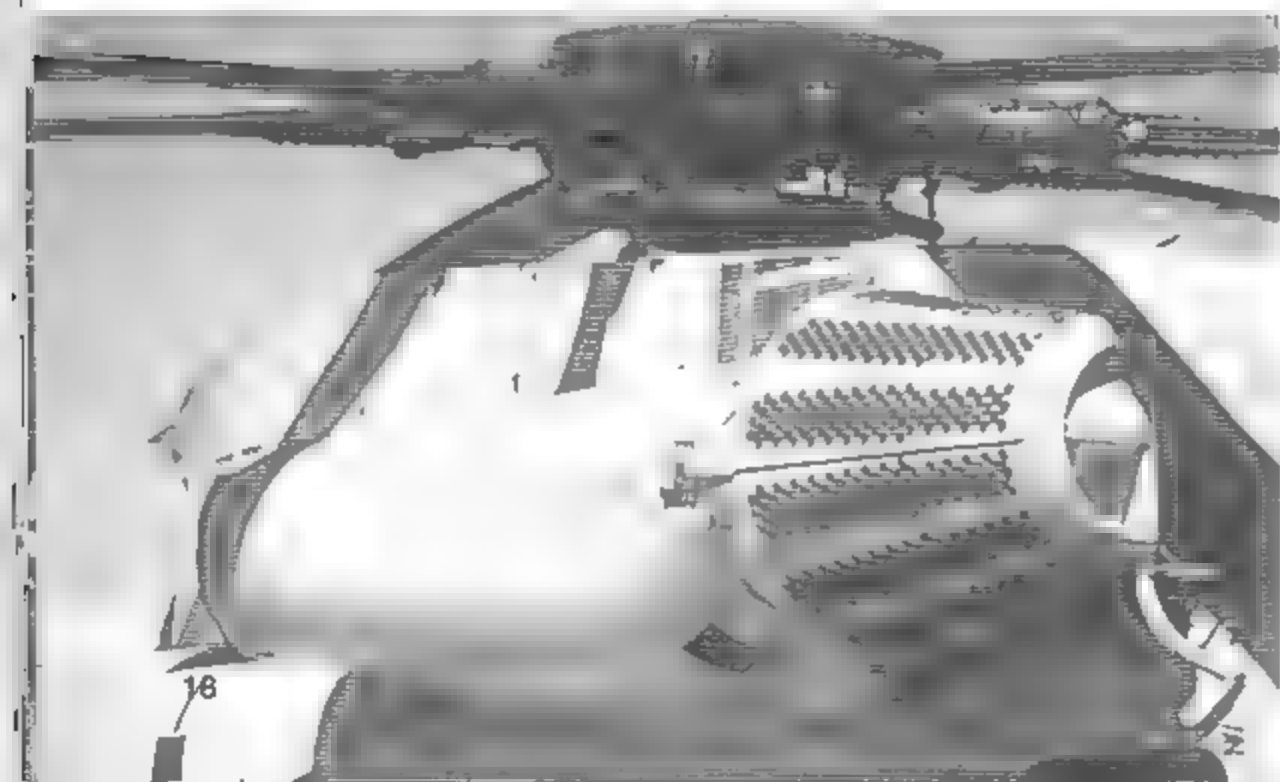
The hatch on the CH-53C's nose provides access to the helicopter's instrument compartment. A flush mounted handle – painted yellow – is used to open this hatch. The nose gear is fully retractable and partially covered by a two-piece door.

An Engine Air Particle Separator (EAPS) is fitted to the intake of the HH-53C's starboard General Electric T64-GE-7 engine. The EAPS filtered out dust, sand, and other foreign objects, which could damage the engine if ingested. Foreign objects were blown out of the EAPS through the tube mounted at the base of the device.



The HH-53C's nose landing gear was common to all twin-engined H-53 variants. The two-piece door unfolded to cover the rearward retracted gear in flight. The nose landing gear turns through 360° for maneuvering the HH-53 on the ground, either under its own power or while under tow.

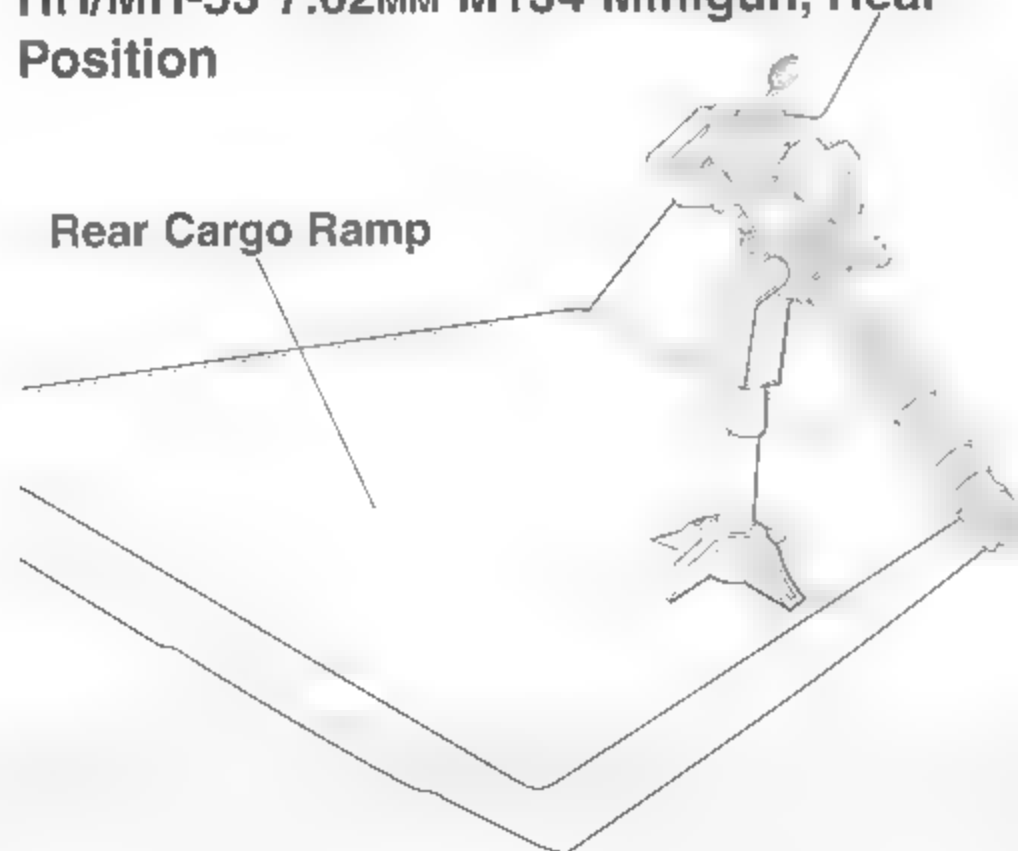
A red cover has been placed inside the port engine exhaust of this HH-53C to keep foreign objects out of the exhaust duct. Each of the HH-53C's two T64-GE-7 turboshaft engines was rated at 3435 shaft horsepower (shp), a ten percent increase over the HH-53B's 3080 shp T64-GE-3 engines.





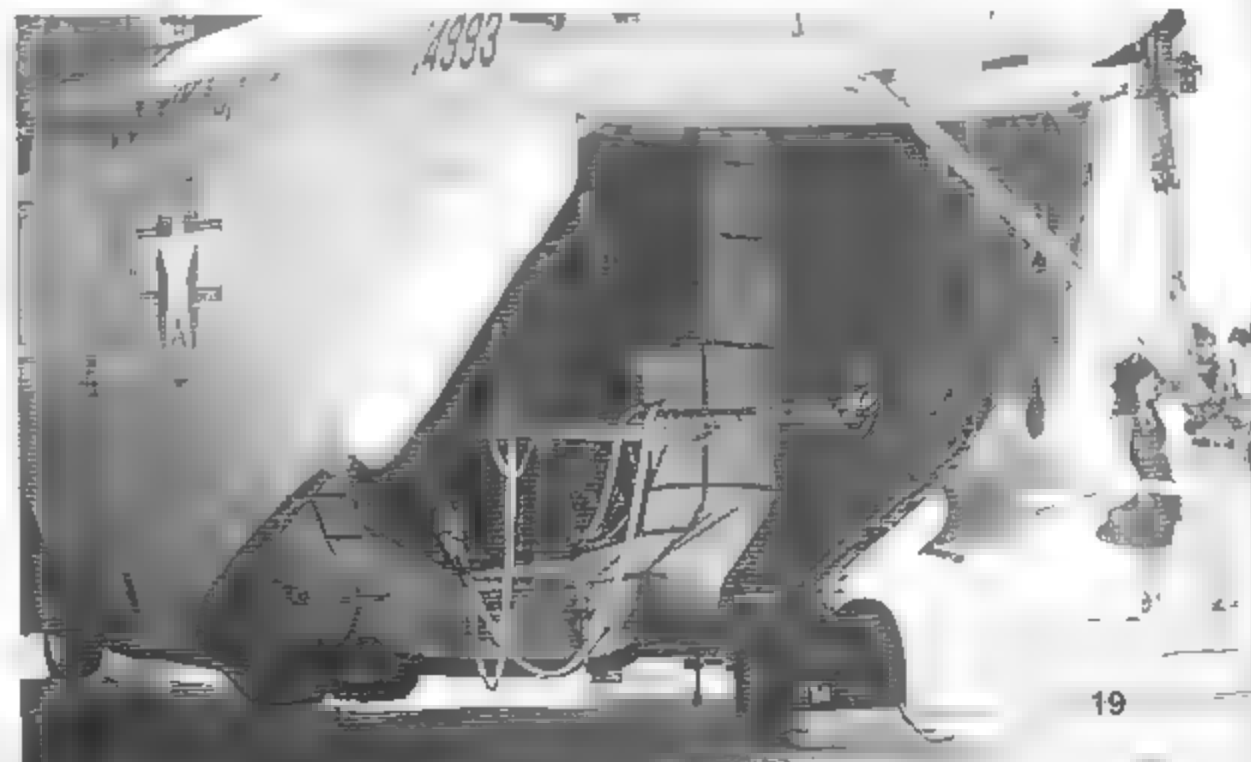
The Sea Stallion's main rotor system and drive components are taken from Sikorsky's earlier CH-54 Tarhe. The rotor hub is made from steel and titanium, while the six main rotor blades were manufactured from aluminum. The later H-53E Super Stallions have seven main rotor blades skinned in fiberglass over a titanium spar. The rotor head fairing reduced drag from this assembly. (Author)

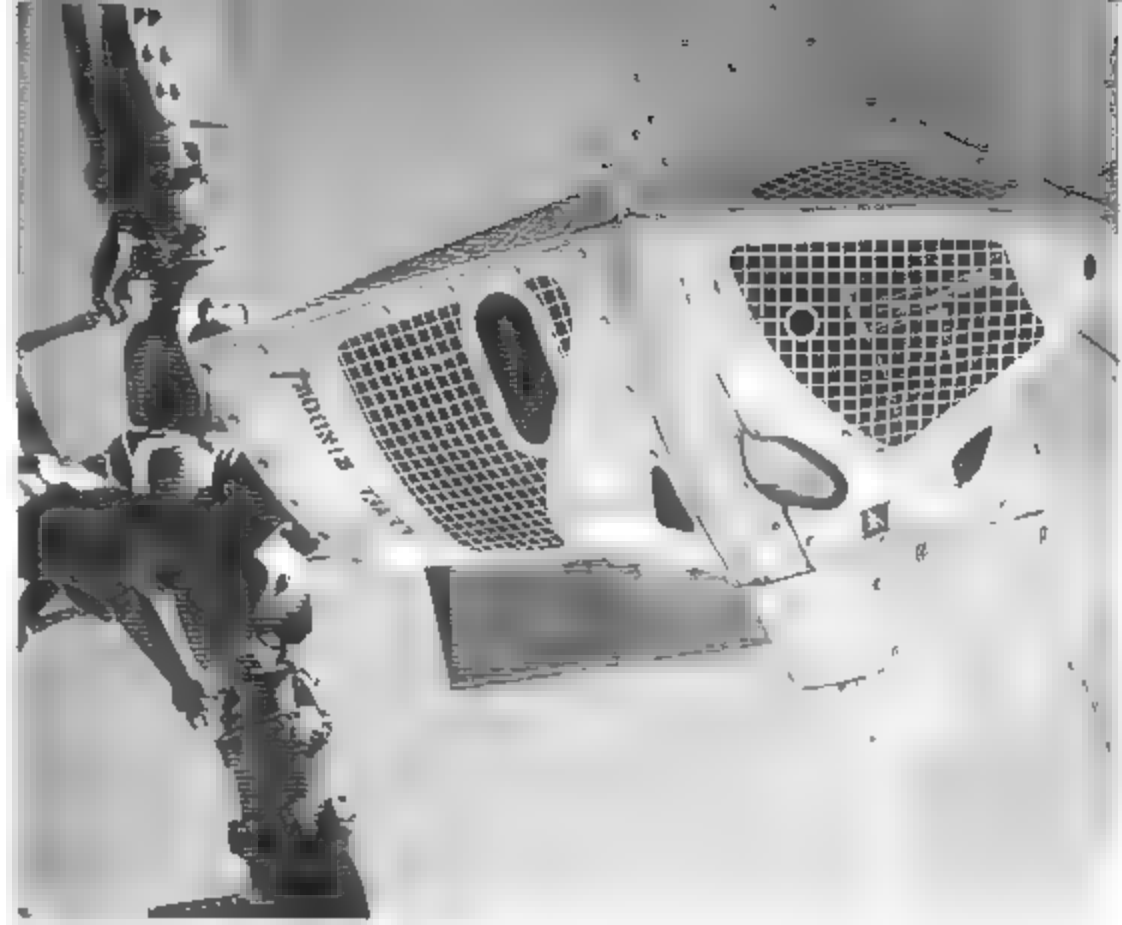
## HH/MH-53 7.62MM M134 Minigun, Rear Position



The H-53's two-wheel main landing gear units are mounted in the back of the sponsons and retract forward. A fuel jettison tube is mounted above the wheels, allowing the crew to rapidly drain the sponson-mounted fuel tanks in an emergency. Each tank mounted in the front of the sponson, holds 525 gallons (1995 L) of JP4 fuel.

The open cargo loading ramp of this HH-53C (67-14993A) reveals a capture device stowed inside. This device is believed to be associated with drone recovery operations. The loop antenna above the aft edge of the strake is a VOR (Very High Frequency Omnidirectional Range)/localizer antenna. This device receives radio waves from ground stations to confirm the aircraft's position. The tail bumper is extended at the end of the tail boom.





(Above Left) The tail pylon of the HH-53C – and other H-53 versions – folds to starboard, which reduces the aircraft's length and height for storage in confined spaces including helicopter carriers. Behind the mesh panel is the bevel drive, which transfers power from the transmission shaft to the final drive shaft – which, in turn, sends power to the tail rotor.

(Above) Mesh panels at the upper rear portion of the HH-53C's tail pylon allow air to circulate around the tail rotor gearbox and dissipate heat generated by this gearbox. The base of the horizontal stabilizer is mounted at the top of the pylon.

## H-53 Colors - USAF

Dark Green (FS34079)/Medium Green (FS34102)/Tan (FS30219) over Light Gray (FS36622) – 1960s to 1980s

ADC Gray (FS16473) – 1970s to 1980s

Dark Green (FS34092)/Medium Green (FS34102)/Gunship Gray (FS36118) – 1980s to 1990s

Battle Gray (FS36173) – 1990s to present

(Left) The H-53's four-bladed tail rotor is derived from that used on the earlier CH-54 Tarhe. The tail rotor counteracts the torque produced by the main rotor and adjusts in pitch to steer the helicopter to the right or left. The pitch control mechanism in front of the hub connects the rotor blades to the control pedals in the cockpit. The rotor blades on all H-53s are made from aluminum. (Author)





## MH-53H PAVE LOW III

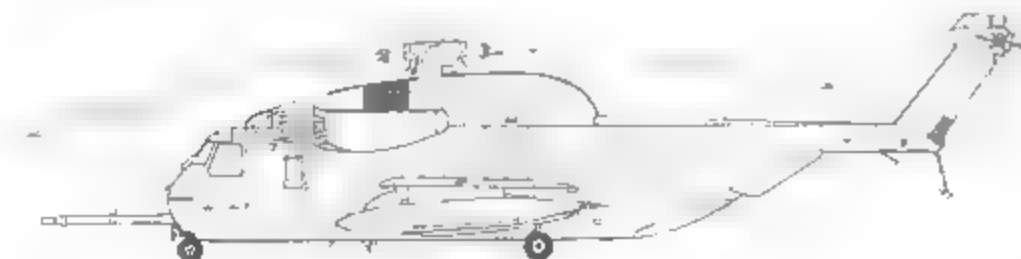
The HH-53C was still not the ultimate Super Jolly configuration, with attention shifted from Southeast Asia back to Western Europe, efforts continued to refit the HH-53s with the capability to operate during the worst weather conditions. An HH-53B (66-14433) was the prototype MH-53H PAVE LOW II mounting a Texas Instruments (TI) AN/APQ-158 radar on the port side of the nose and a TI AN/AAQ-10 FLIR (Forward Looking Infrared) to starboard to provide infrared imagery. This aircraft was flown in a Blue/Gray scheme, but more conventionally, European colors – Dark Green (FS34092), Medium Green (FS34102), and Dark Gray (FS36118) – were later applied and these were also adapted for service aircraft. Eight PAVE LOW IIIs – all converted from HH-53Cs – were in service by the early 1980s. The six survivors were later joined by two converted CH-53Cs. An increasing emphasis on special operations led to the use of the 'MH' designation, in place of the 'HH' designation for SAR helicopters.

## MH-53J PAVE LOW III Enhanced

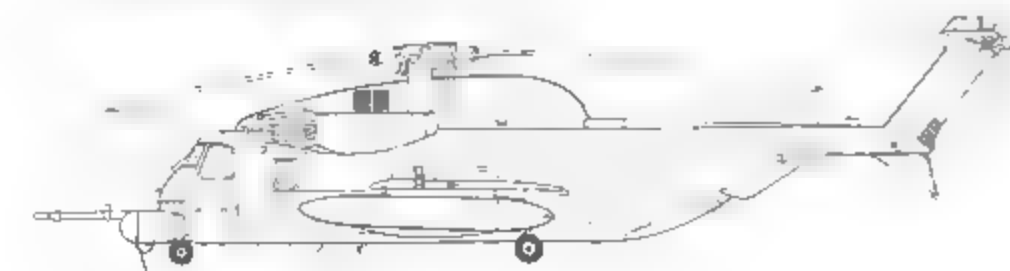
The increased importance of special operations forces (SOF) during the 1980s led to several programs to increase SOF airlift capability. Although renewed production of the MH-53 was not feasible, it was possible to retrofit existing Air Force Super Jollies and PAVE LOWs to the enhanced MH-53J standard, with refurbished airframes and new systems.

PAVE LOW crews are expected to deal with all manner of threats, ranging from rifle fire to SAMs and interceptors. A variety of countermeasures are carried, including the Saunders AN/ALQ-126 and Loral AN/ALQ-157 jammers, and Tracor AN/ALE-40 chaff/flare dispensers.

### HH-53C



### MH-53J PAVE LOW III

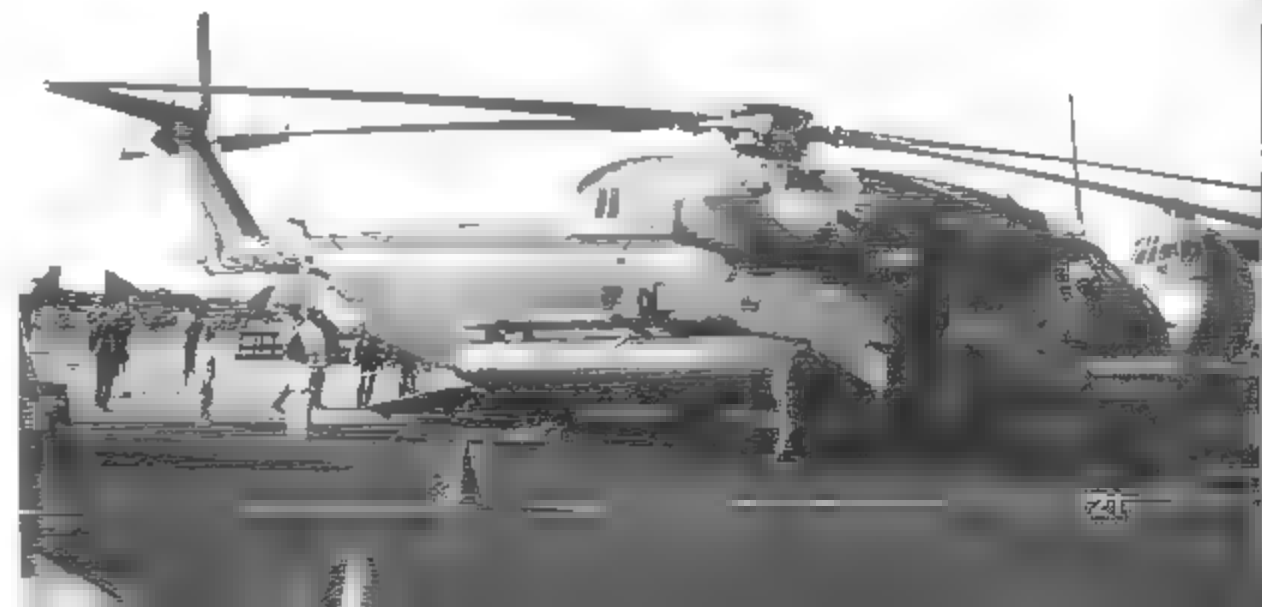


AN/APQ-158 Radar

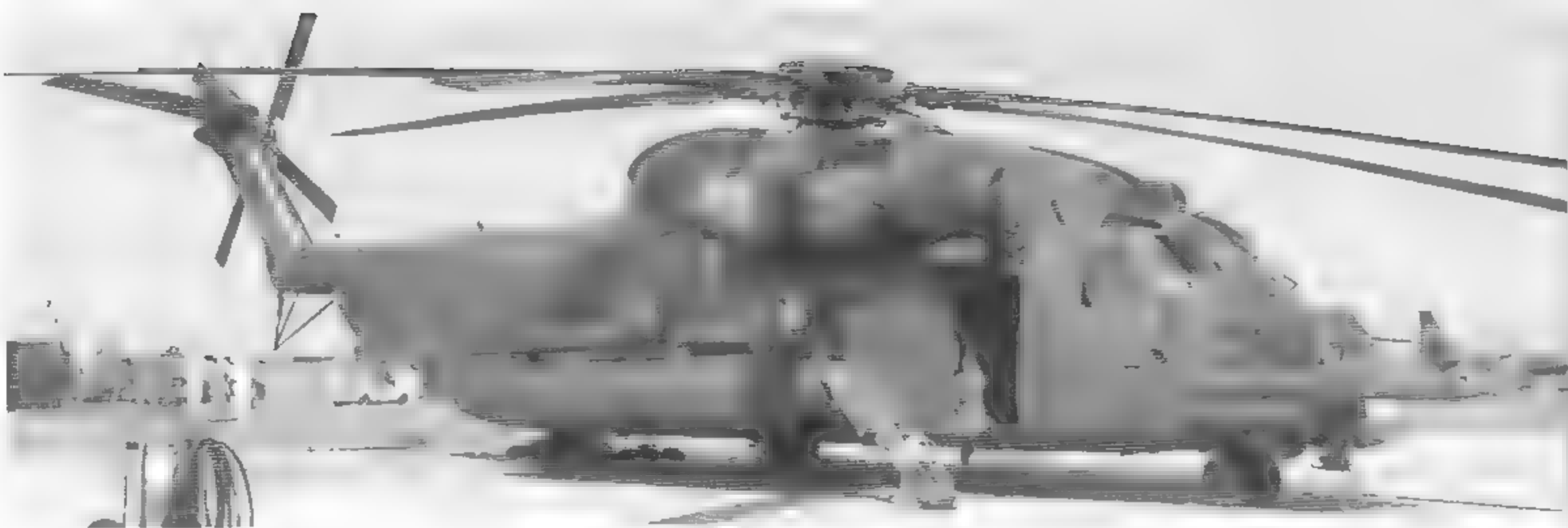


This former CH-53C (70-1629) was converted to its present MH-53J PAVE LOW III configuration when it was displayed at RAF Aiconbury, England, on 21 August 1993. A communications antenna was added just forward of the tail rotor fold point. Tracor AN/ALE-40 chaff and flare dispensers – used to counter radar-homing and heat-seeking missiles, respectively – were fitted to the fuselage just aft of the sponsons. A Loral AN/ALQ-157 IR (Infrared) jammer is placed on the sponson to deceive heat-seeking missiles. (Robbie Robinson)

This MH-53J PAVE LOW III (70-1629) wears the European I camouflage scheme of Dark Green (FS34092), Medium Green (FS34102), and Gunship Gray (FS36118). Markings are Black, while the star on the mid-fuselage national insignia is partially obliterated. Parked behind the MH-53J is a Lockheed HC-130 COMBAT SHADOW tanker, which supports the PAVE LOWs on their missions. (Robbie Robinson)







NATO activities in Bosnia and supporting the recovery operations following the crash of a Boeing CT-43 carrying Secretary of Commerce Ron Brown in Croatia on 3 April 1996.

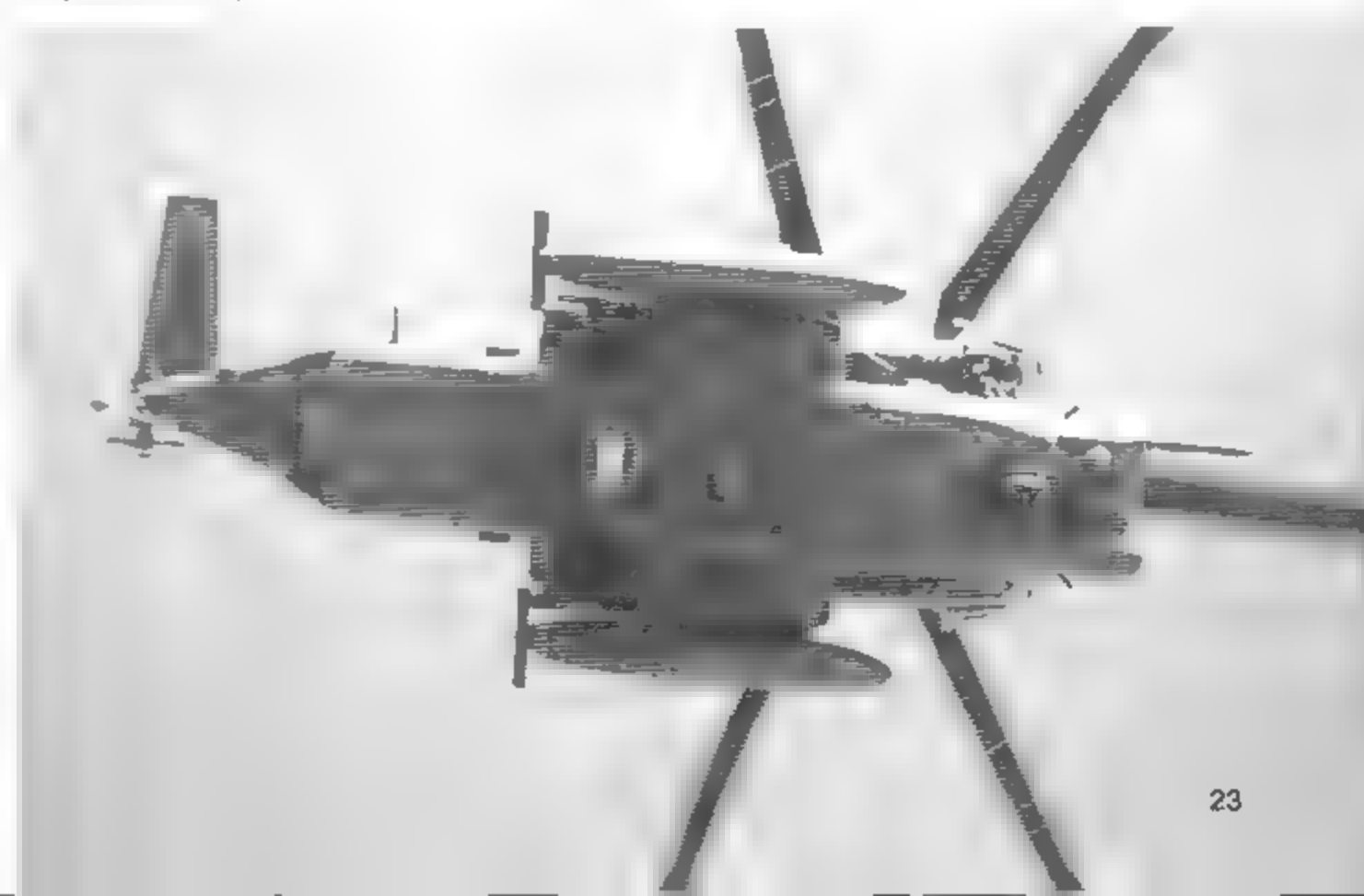
This MH-53J PAVE LOW III Enhanced was still painted in the European I camouflage when it was displayed at RAF Fairford, England in July of 1989. The rescue hoist mounted above the crew entry doorway is equipped with a jungle penetrator for insertion into deeply wooded areas. The rescue litter propped up against the starboard external fuel tank is used to haul up individuals too injured to use the jungle penetrator. (Nick Challoner)

## MH-53M PAVE LOW IV

Although the ultimate replacement for the PAVE LOW fleet appears likely to be the Bell/Boeing CV-22 Osprey tilt-rotor aircraft, the MH-53's retirement is still some years away. Extensive upgrades of navigation systems and sensors began in the 1990s, resulting in the MH-53M PAVE LOW IV designation being applied to refitted aircraft.

MH-53Ms were active during Operation ALLIED FORCE against Yugoslavia in 1999, then participated in Operation ATLAS RESPONSE in early 2000. The latter was part of the international effort to bring humanitarian aid to Mozambique, where flooding had displaced hundreds of thousands of people. The PAVE LOW IVs active in Mozambique were from the 21st SOS and had deployed to Hoedspruit, South Africa for the operation, along with supporting MC-130Ps from the 67th SOS. Both squadrons are assigned to the 352nd Special Operations Group (SOG) at RAF Mildenhall, England.

The AN/AAQ-10 FLIR is mounted under the refueling probe of this MH-53J, while the AN/APQ-158 radar antenna is fitted to port. Various antennas and counter measures devices are placed along the sides and undersides of the MH-53J. The horizontal stabilizer mounted to all H-53s helps provide the aircraft with stability and good handling at high speeds. (Nick Challoner)

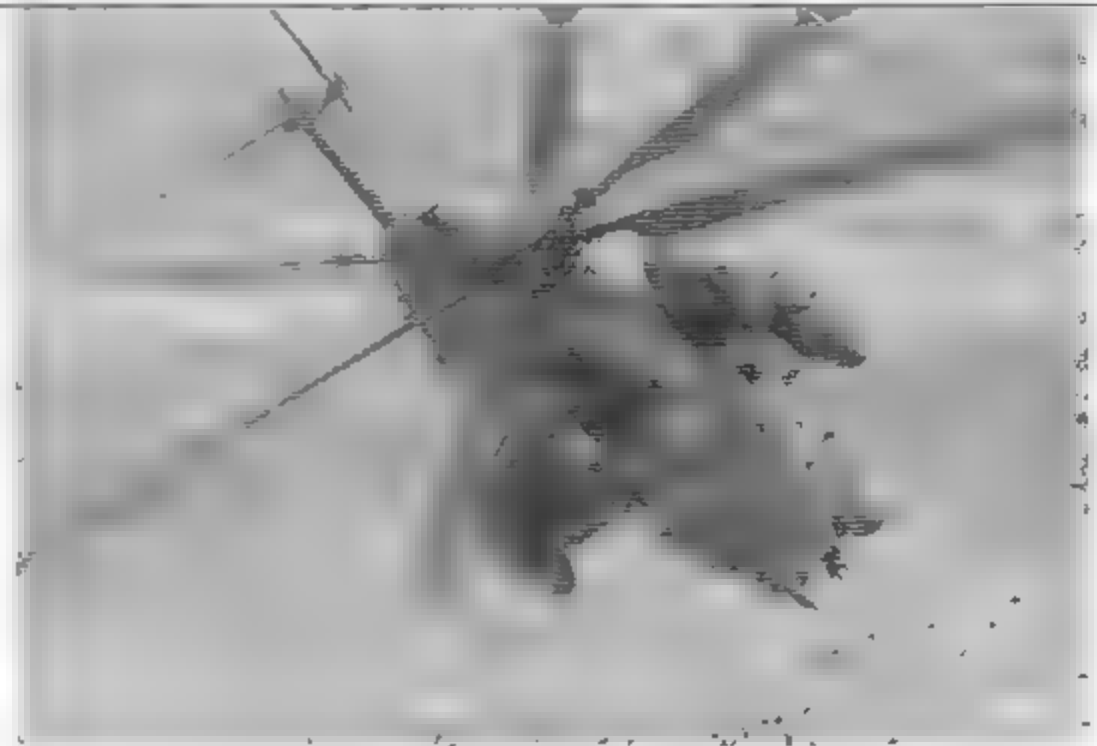






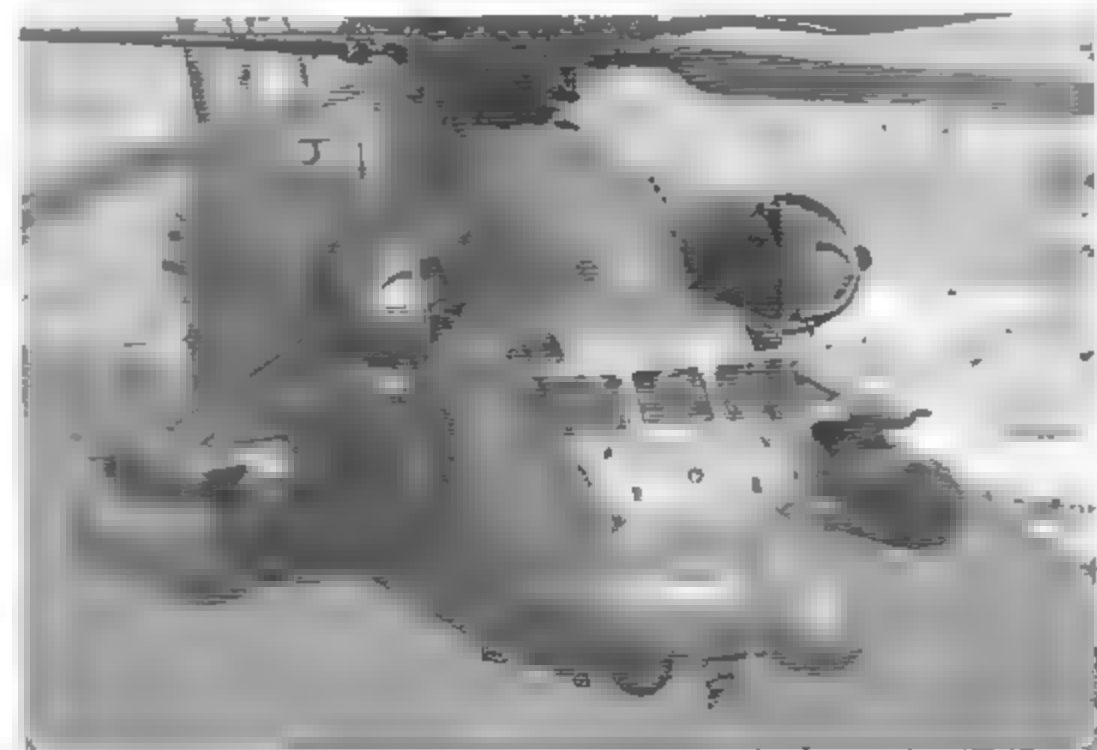
Two MH-53J PAVE LOW IIIs assigned to the 20th Special Operations Squadron (SOS) skim the beach near their home base of Hurlburt Field, Florida. The helicopters' main rotor blades churn debris up during the MH-53J's low level flight exercise. The Engine Air Particle Separator (EAPS) filters placed on the engine intakes prevent this debris from entering and damaging the engines. The 20th SOS is assigned to Air Force Special Operations Command (AFSOC), headquartered at Hurlburt. (US Air Force Photo by Staff Sgt Andy Dunaway)

This low-flying MH-53J PAVE LOW III Enhanced displays the overall Battle Gray (FS36173) scheme with Black markings applied to USAF special operations aircraft during the 1990s. This aircraft can reach a speed of 196 mph (315 km/h) at sea level, with an unrefueled range of 540 miles (864 km). (Nick Challoner)



An MH-53J PAVE LOW III assigned to the 551st Special Operations Squadron, 58th Special Operations Wing (SOW) banks to starboard while on a training mission from Kirkland Air Force Base, New Mexico. The 58th SOW provides training for MH-53J flight and ground crews. The external fuel tank bracing struts indicate this aircraft was originally built as an HH-53B before conversion to PAVE LOW III standards. (US Air Force Photo by MSgt Dave Nolan)

A 7.62mm General Electric M134 Minigun peers out of the starboard crew access door of this MH-53J PAVE LOW III. The MH-53s also carry a Minigun in the port side window and on the rear cargo ramp to provide covering fire for the helicopter and personnel. A 500-watt SX-5E Infrared spotlight mounted under the nose provides illumination for night operations. (US Air Force Photo by MSgt Dave Nolan)



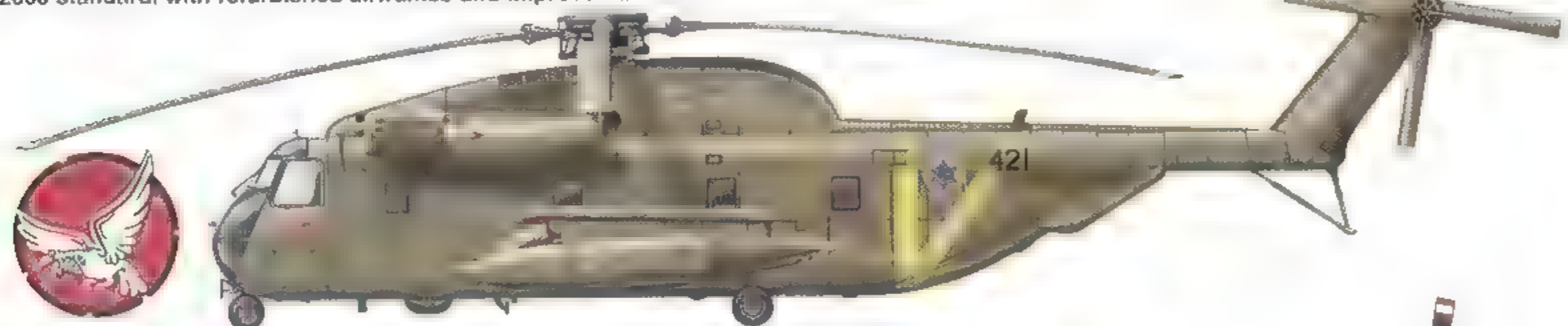
Marine Heavy Helicopter Squadron 777, a US Marine Corps Reserve unit, flew this CH-53A Sea Stallion (BuNo 154867) from Naval Air Station Dallas, Texas during the early 1970s.



CH-53A (BuNo 152401) was repainted in a three-tone camouflage scheme during the early 1980s. The Sea Stallion was assigned to HMH-772, a Reserve squadron at NAS Willow Grove, Pennsylvania.



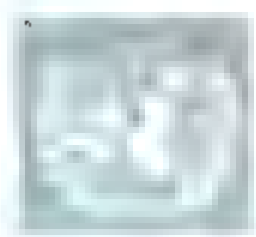
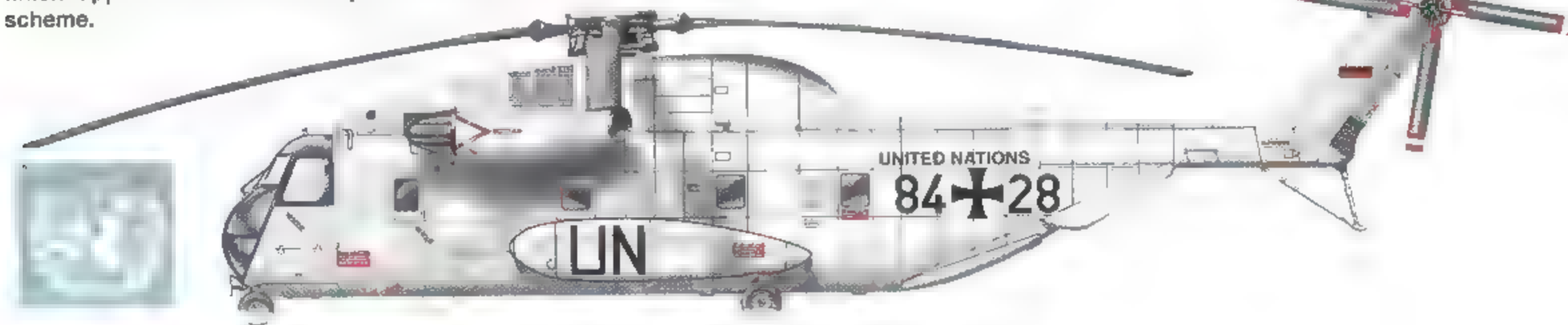
CH-53A (421), painted overall Brown (FS30145), is operated by the 'First CH-53' Squadron of the Israel Defense Force/Air Force. Surviving Israeli CH-53As have been upgraded to Yas'ur (Albatross) 2000 standard, with refurbished airframes and improved avionics.



RH-53D Sea Stallion (BuNo158688), painted overall Gloss Engine Gray (FS16081), was assigned to Helicopter Mine Countermeasures Squadron 12 at NAS Norfolk, Virginia during the 1970s. HM-12 performed Airborne Mine Countermeasures duties for the US Atlantic Fleet.



The United Nations leased German *Heeresflieger* (Army Aviation) CH-53Gs to transport weapons inspectors around Iraq after the 1991 Persian Gulf War. Desert operations weathered the temporary white finish applied over the helicopter's standard Olive Green color scheme.

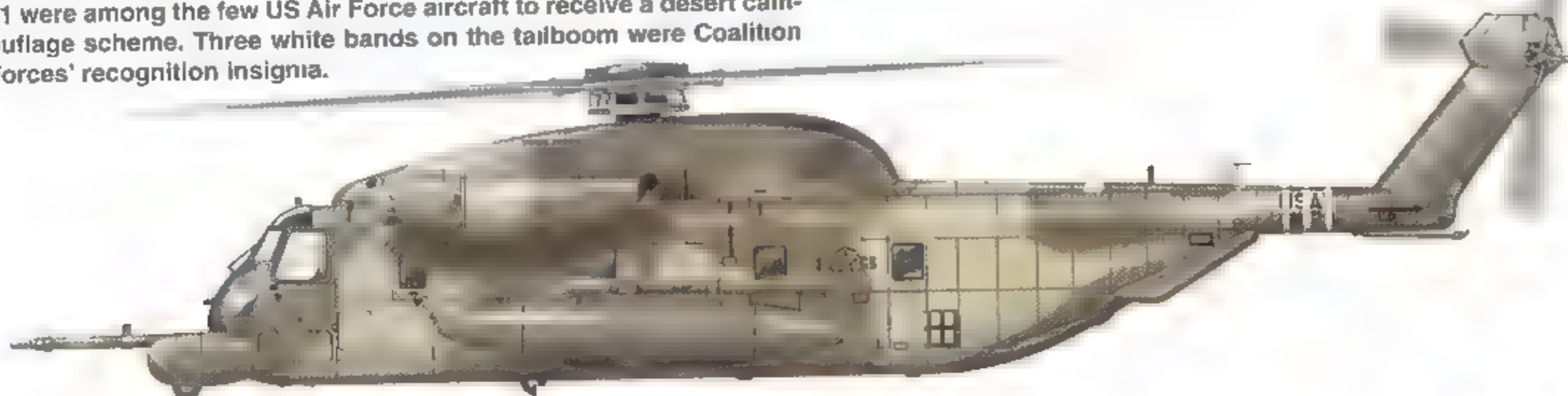




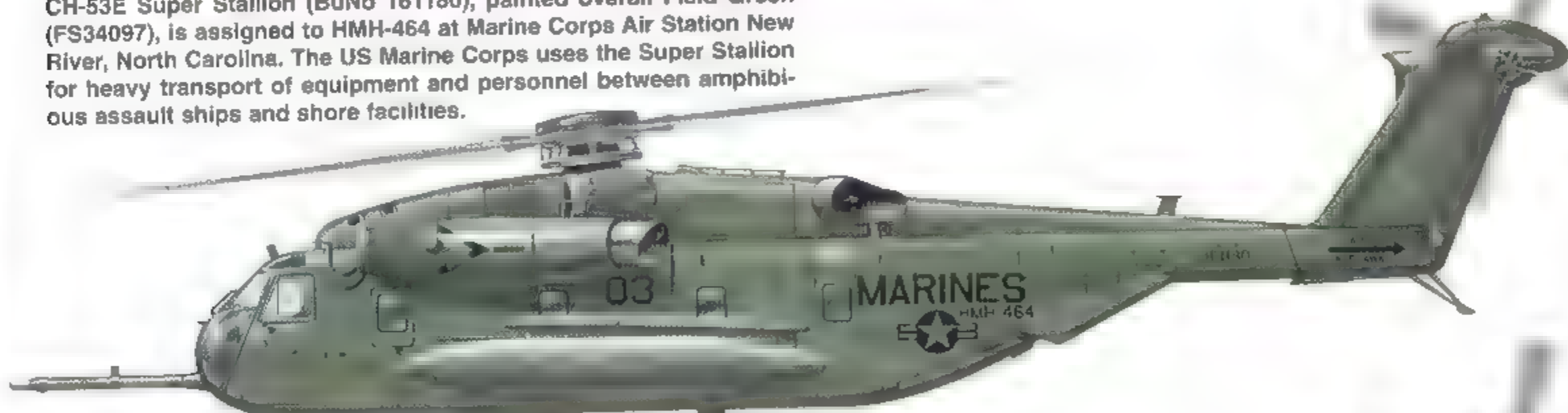
MH-53J PAVE LOW III (70-1629) received an overall European I camouflage for operations during the 1980s. The aircraft were rebuilt from HH-53Cs to incorporate advanced navigation and communications equipment for special operations missions.



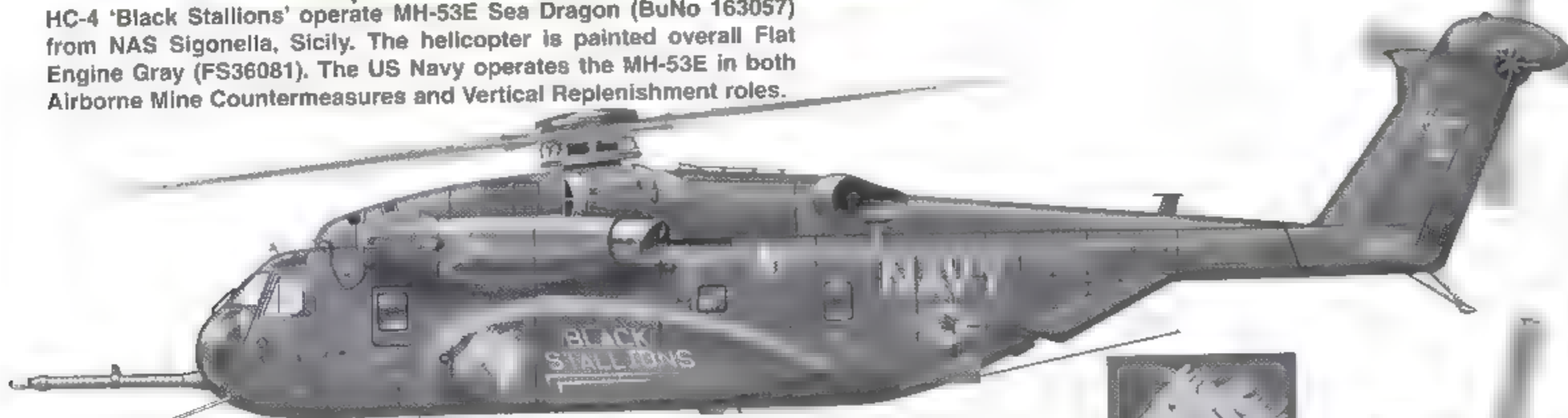
MH-53J PAVE LOW IIIs deployed to the Persian Gulf region in 1990-91 were among the few US Air Force aircraft to receive a desert camouflage scheme. Three white bands on the tailboom were Coalition Forces' recognition insignia.



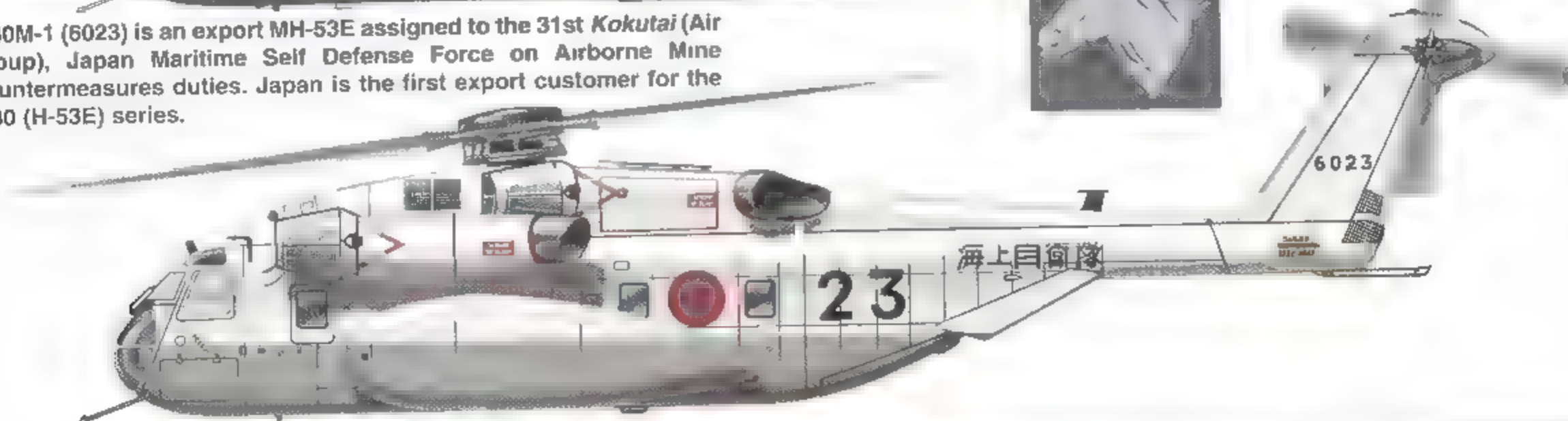
CH-53E Super Stallion (BuNo 161180), painted overall Field Green (FS34097), is assigned to HMH-464 at Marine Corps Air Station New River, North Carolina. The US Marine Corps uses the Super Stallion for heavy transport of equipment and personnel between amphibious assault ships and shore facilities.



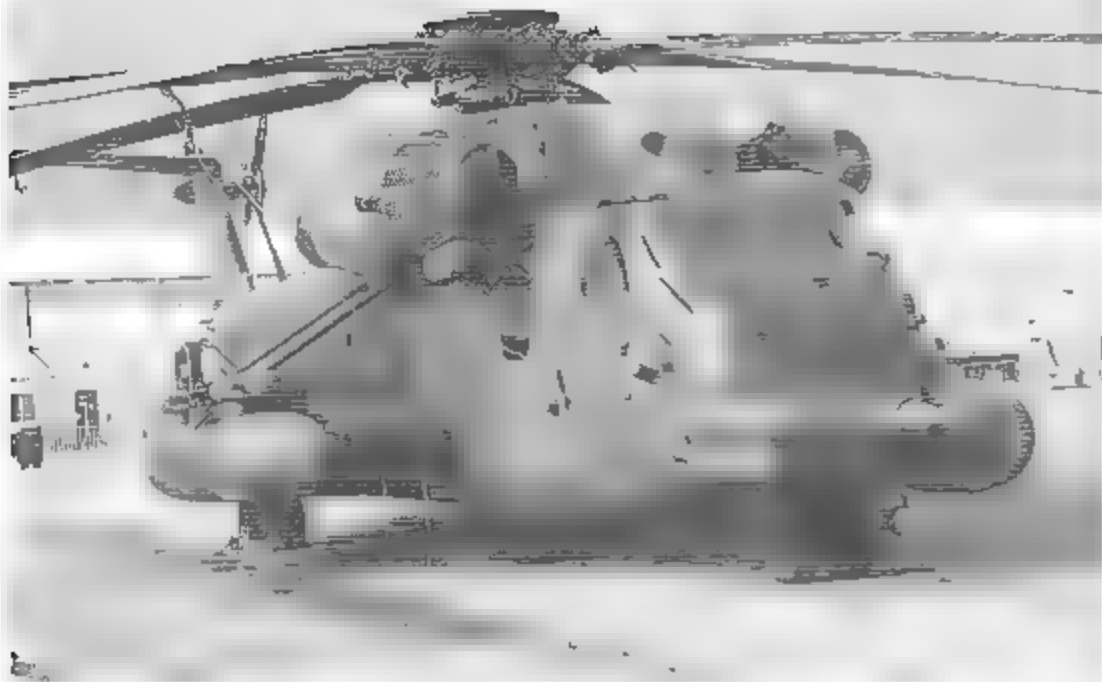
HC-4 'Black Stallions' operate MH-53E Sea Dragon (BuNo 163057) from NAS Sigonella, Sicily. The helicopter is painted overall Flat Engine Gray (FS36081). The US Navy operates the MH-53E in both Airborne Mine Countermeasures and Vertical Replenishment roles.



S-80M-1 (6023) is an export MH-53E assigned to the 31st Kokutai (Air Group), Japan Maritime Self Defense Force on Airborne Mine Countermeasures duties. Japan is the first export customer for the S-80 (H-53E) series.

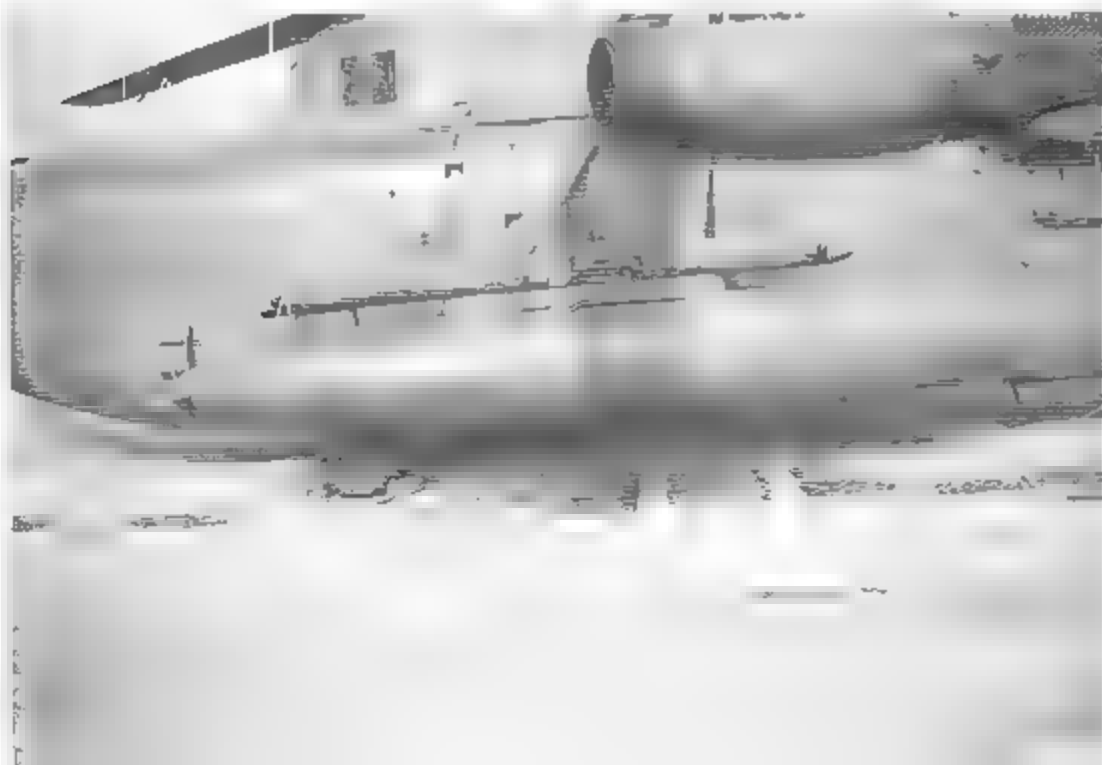






This MH-53J (66-14431) began as the fourth HH-53B built for the USAF before rebuilding to PAVE LOW III Enhanced standard. One of the oldest PAVE LOWs in service, this aircraft wears the new overall Battle Gray camouflage in the summer of 1994. (Joe E. Michaels/JEM Aviation Slides)

MH-53J 66-14431 retains the externally-braced 650 gallon fuel tanks from its earlier HH-53B incarnation. Infrared Countermeasures (IRCM) equipment is fitted to the fuel tank sponsons to deceive enemy heat-seeking missiles. Just above the aft end of the external fuel tank is the AN/ALE-40 chaff/flare dispenser. (Joe E. Michaels/JEM Aviation Slides)



The MH-53J's refueling boom is retracted most of the time. This probe is extended during refueling operations to insure the tanker's drogue is clear of the main rotor blades. The AN/AAQ-10 FLIR turret is mounted under the probe on the MH-53J's starboard nose, with the AN/APQ-158 radome to port. An infrared spotlight between the FLIR turret and the radome provides lighting for night operations. (Joe E. Michaels/JEM Aviation Slides)

PAVE LOW MH-53s are equipped with SATCOM (satellite communications) antennas for communications anywhere in the world. Air Force MH-53s retain the tail fold feature of the Marine CH-53s. The PAVE LOWs demonstrated their shipborne capability during the intervention in Haiti in 1994. All markings are Black on the Battle Gray aircraft. (Joe E. Michaels/JEM Aviation Slides)



# CH-53D Sea Stallion

The uprated but similar **CH-53D** replaced the A-model on the Stratford, Connecticut, production line by 1968-69 and the newer models were soon seeing action in Vietnam. These 126 helicopters were built with the more powerful 3925 shp General Electric T64-GE-412 or 413 engines and could carry 55 troops when using a high-density seating plan. Dimensionally identical to the CH-53As, the CH-53D's empty weight was increased to 23,628 pounds (10,740 kg) and its maximum weight to 36,693 pounds (16,679 kg). Despite the extra weight, performance was not degraded thanks to the new engines and the maximum rate of climb was increased to 2320 feet (696 m) per minute. CH-53D production ended in January of 1972.

CH-53s saw much use in evacuating Americans from countries about to fall to the Communists when US involvement in Southeast Asia finally ended in the spring of 1975. On 12 April, when Cambodia collapsed, Operation EAGLE PULL was launched to withdraw Americans from Phnom Penh using CH-53s from the USS HANCOCK (CVA-19) and USS OKINAWA (LPH-3). On 29 April, with the triumphant North Vietnamese Army pushing into Saigon and after a fixed-wing airlift had been halted, Operation FREQUENT WIND OPTION IV pulled out the remaining Americans plus a few fortunate South Vietnamese.

Working alongside Air Force HH-53s, Marine CH-46s Sea Knights, and Air America UH-1 Hueys, Sea Stallions flying from the aircraft carriers helped to shuttle refugees out to the US fleet lying offshore. Tan Son Nhut Air Base was one center for the evacuation, but CH-53

The Auxiliary Power Unit (APU) cover has been opened on CH-53D, HP-7 (BuNo 157153). This Sea Stallion was assigned to HMHT (Marine Heavy Helicopter Training Squadron)-401 at MCAS New River, North Carolina in the early 1970s. The squadron was deactivated in April of 1972. CH-53Ds originally had high visibility markings and lacked the Engine Air Particle Separator (EAPS) on the engine intakes. (Joe Michaels/USM, Aviation, Stinson)

crews also had to bring their huge aircraft into a parking lot at the US Embassy while smaller helicopters operated from the embassy roof. Overloaded with refugees, the crews also had to deal with a chaotic situation on the ground, as well as the SAM (Surface to Air Missile) and AAA (Anti-Aircraft Artillery) threat from the advancing North Vietnamese Army (NVA). F-14 Tomcat combat air patrols from the USS ENTERPRISE (CVN-65) covered the operation along with US fighters from Thailand, since captured South Vietnamese combat aircraft were already in use by the Communists and could have been used against the airlift. The airlift was finally over by the early afternoon of 30 April, with the pullout of the last US citizens and Marine protection forces. No American aircraft were lost to communist fire although a Huey and a CH-46 went down during the operation in accidents.

The next combat CH-53 crews saw was in Beirut, Lebanon, where the USMC made up part of the Multinational Peacekeeping Force sent in to restore order after the Israeli invasion in 1982. This mission eventually disintegrated into fighting between the peacekeepers and Lebanese militias and CH-53s flying from amphibious ships offshore were pivotal in keeping the Marine bastion at the Beirut airport resupplied.

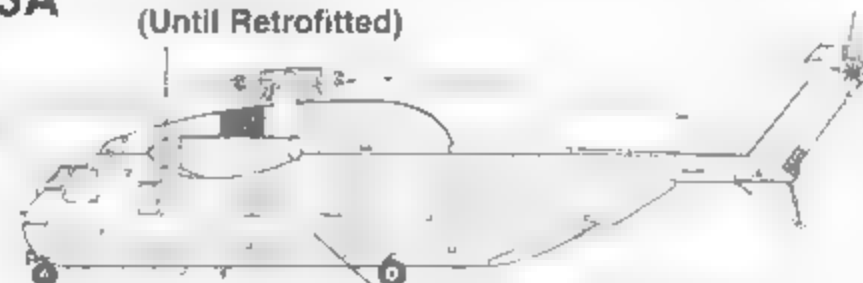
On 25 October 1983, Sea Stallions attached to HMM-261 of the 22nd Marine Amphibious Unit (MAU) participated in Operation URGENT FURY, the US invasion of Grenada. Taken over by a Communist coup, the small Caribbean island had much potential as a forward base for Soviet activities in the western hemisphere, with one completed airport and another under construction which was suitable for use by heavy aircraft. Additionally, nearly one thousand US medical students on the island were under threat of being taken hostage if the situation deteriorated further. Launching from the helicopter carrier GUAM (LPH-9), Marines made an early morning assault on Pears Airport on the eastern side of the island. Sea Stallions brought ashore vehicles, ammunition, and other materials necessary for the Marine operation to secure the northern half of Grenada. CH-53s also helped bring out over 300 students and other noncombatants, as well as weapons captured from Cuban and Grenadan forces.

On 4 August 1990, while the Persian Gulf Crisis was beginning, CH-53Ds were rescuing US



**CH-53A**

No EAPS Filters  
(Until Retrofitted)



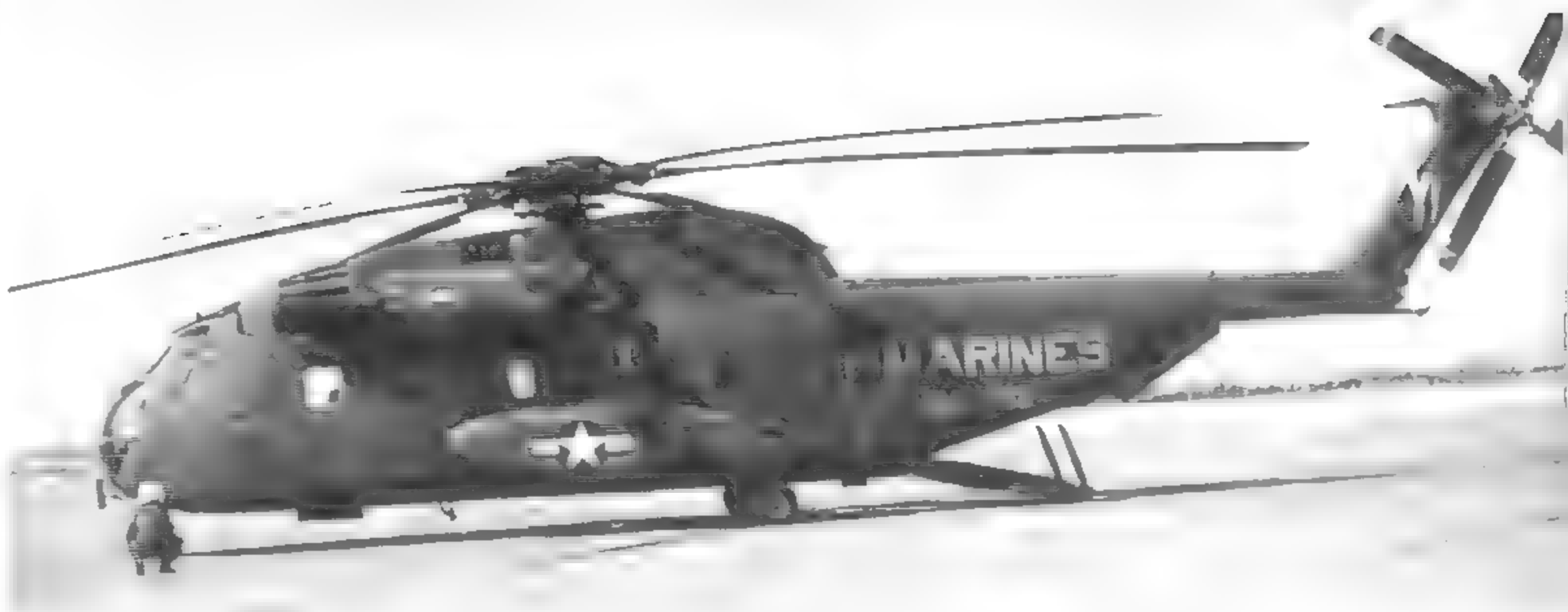
**CH-53D**

EAPS Filters  
(Standard)

No Provision for External  
Fuel Tanks



Provisions for External Fuel  
Tanks



(Above) YL/11 (BuNo 156951) led the second batch of 20 CH-53Ds ordered by the USMC. A ground crewman is performing a nose wheel check on this HMH-362 Sea Stallion to ensure proper operation of the undercarriage. The Squadron was based at MCAS New River, North Carolina and attached to the Fleet Marine Force Atlantic. (Joe Michaels)

citizens from war-torn Liberia as part of Operation SHARP EDGE. The Liberian evacuation force was centered on the helicopter carrier SAIPAN (LHA-2).

Although procurement of the CH-53E had been underway for a decade by the time of the Gulf War, the CH-53D was still much in service and several squadrons flying the type were committed to Operations DESERT SHIELD/DESERT STORM.

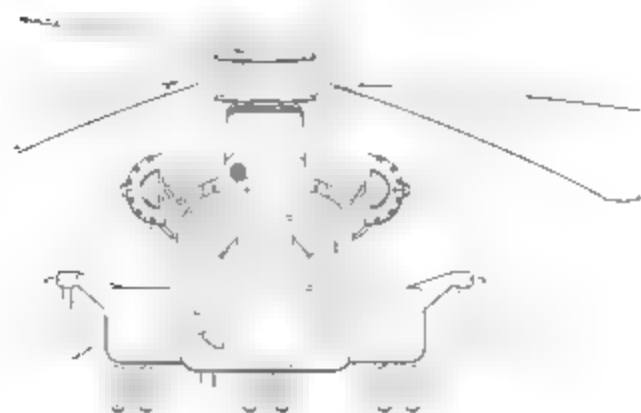
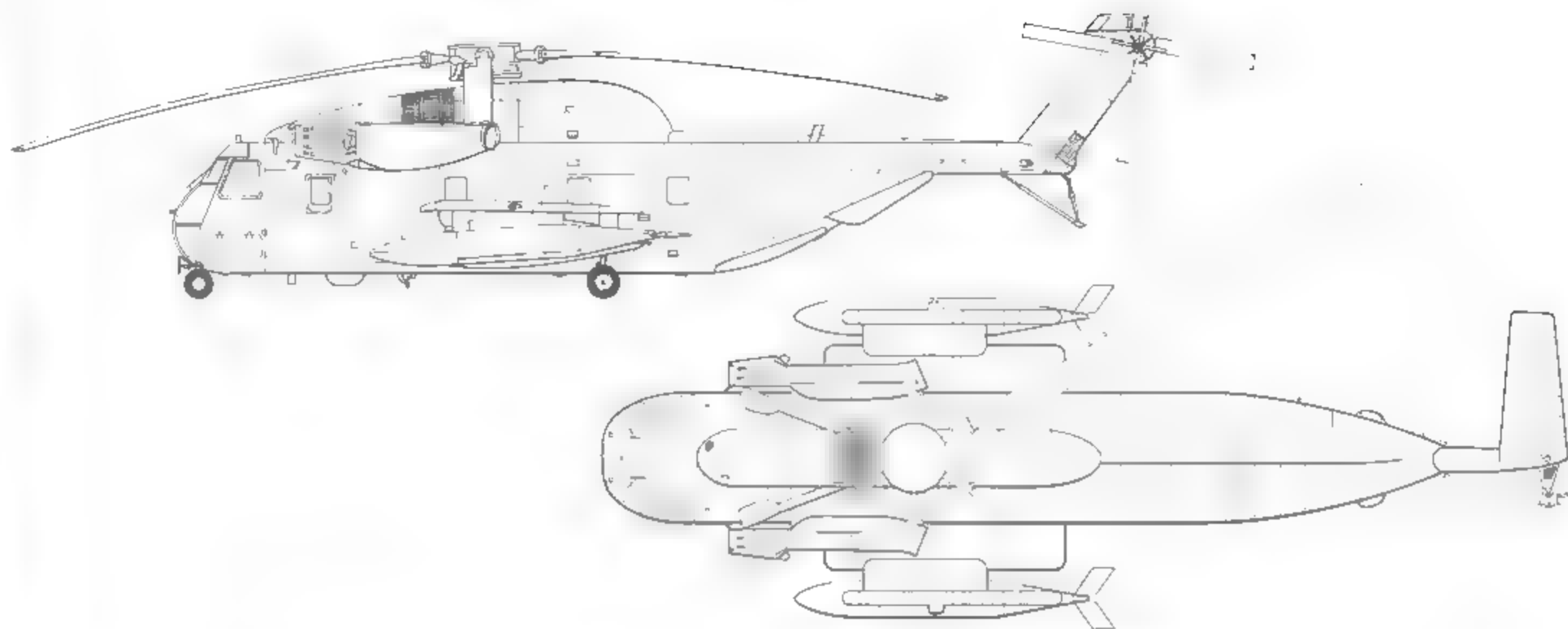
Post DESERT STORM, six CH-53Ds were deployed off the coast of the former Yugoslavia as part of the carrier THEODORE ROOSEVELT's (CVN-71) air wing, and HMH-363 flew the type in Somalia in support of Operation RESTORE HOPE in 1992-93. The remaining CH-53Ds were replaced in USMC service by CH-53Es during the 1990s. There were 27 CH-53Ds at AMARC (Aerospace Maintenance and Regeneration Center) on 1 May 2000.

One CH-53D Sea Stallion was returned to Sikorsky to flight test the canted tail rotor of the new CH-53E Super Stallion and another was used to demonstrate the type's suitability as a large commuter liner.

Marine squadron HMX-1 at Quantico, Virginia flew two special VH-53Ds alongside its Presidential VH-3s and VH-60s, the 'VIP Stallions' having been given new interiors and paint schemes for this mission.

(Below) VZ/77 (BuNo 157143) was on strength with HMH-36 at MCAS Tustin, California during 1970-71. This CH-53D was retrofitted with EAPS intake filters which were installed on USMC Sea Stallions during the 1970s. Marine helicopters were painted overall Field Green (FS34097) with white lettering and full-color national insignia during this period. (Joe Michaels/JEM Aviation Slides)





## Sikorsky CH-53D Sea Stallion Specifications

**Main Rotor Span.....72 Feet 3 Inches (22 m)**

**Fuselage Length.....67 Feet 2 Inches (20.5 m)**

**Height.....17 Feet 1.5 Inches (5.2 M)**

Empty Weight.....23,628 Pounds (10,740 kg)

**Maximum Weight.....36,693 Pounds (16,679 kg)**

**Power Plants.....Three 3925 SHP General Electric T-64-GE-412 or -413  
Turboshaft Engines**

**Armament.....None**

## Performance

**Maximum Speed.....184 MPH (296 KM/H) at Sea Level**

**Service Ceiling.....12,450 Feet (3794.8 m)**

**Range.....578 Nautical Miles (665.6 Statute Miles/1071.2 km)**

Crew.....Three





CH-53s are the largest aircraft deployed aboard US Navy helicopter carriers and help provide the Marines with a heliborne assault capability from far offshore. A number of active USMC squadrons still fly the veteran CH-53D, the newest of which were built in 1972. (Nick Waters III)

A Marine CH-53D flies off the Norwegian coast during a NATO (North Atlantic Treaty Organization) exercise. Sea Stallions would have been used to bring heavy equipment to this area - NATO's Northern Flank - in the event of a Warsaw Pact attack against the West. (Nick Waters III)



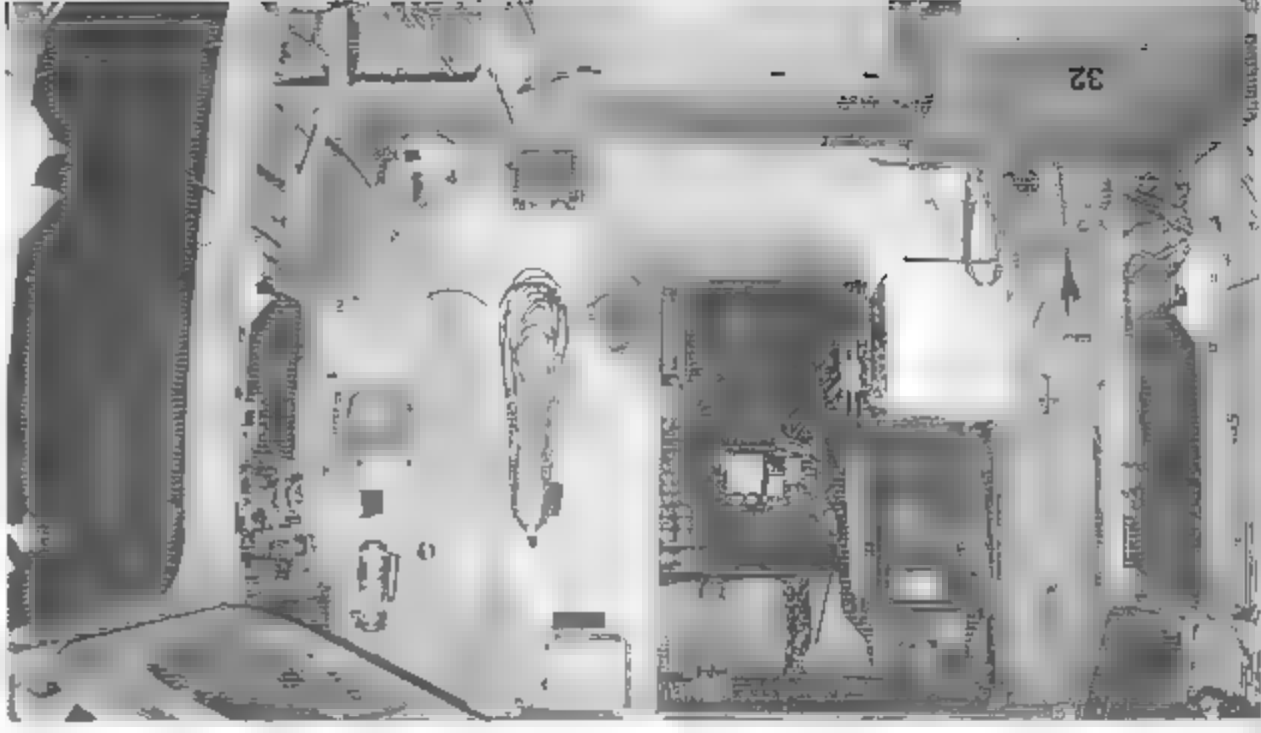
A Marine CH-53D flying just offshore during an exercise is fitted with an exhaust suppression system over the engine outlet. The Sea Stallion's two T64 turboshaft engines can be fitted with these shields to lower the engines' infrared (IR) signature. Flare launchers were normally fitted to the aft fuselage to provide additional defense against shoulder-fired Surface to Air Missiles (SAMs). (Nick Waters III)

A CH-53D Sea Stallion is in its element - outbound from a beachhead and passing over a utility landing craft (LCU) and the tank landing ship USS NEWPORT (LST-1179). CH-53s are based aboard the larger LHA (TARAWA-class) and LHD (WASP-class) helicopter carriers, although they operate with other US Navy amphibious assault ships. (Nick Waters III)





The instrument panel for the CH-53D includes a column of engine control dials, located in the right center port on of the panel. Immediately left of the engine instruments is the master warning panel. Flight instruments for the co-pilot (port) and pilot (starboard) are duplicated, allowing either pilot to fly the helicopter. Radio communications and navigation controls are located in the central console between the seats. (Don Hinton)

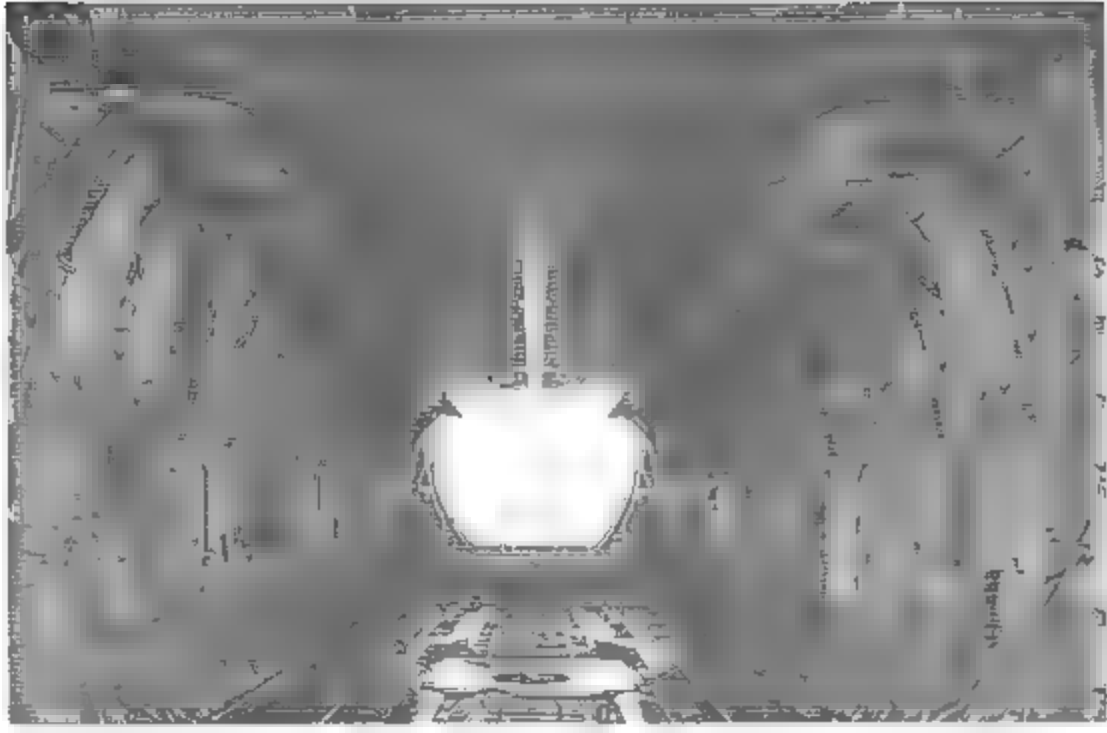


Access to the CH-53D's cockpit is through a passageway in the forward cargo hold bulkhead. The crew access door is placed on the starboard side of the forward fuselage and features a separate upward hinged window. The helicopter's crew chief sits in the chair beside the doorway. The long cord hanging on the bulkhead is the crew chief's intercom line. (Don Hinton)



Controls for the aft cargo ramp and the underside cargo hook are mounted on the aft edge of the overhead cockpit console. Switches for the CH-53D's internal and external lights are placed in the center of this console. Power control levers are positioned at the forward edge of the console. Green tinted windows for the pilots' upward vision flank the overhead console. (Don Hinton)

Seats for 55 troops line the walls of the CH-53D's cargo hold. The Sea Stallions were retrofitted with Israeli-designed crash resistant troop seats in the event of an accident. The lowered cargo ramp folds up to serve as the aft cargo hold wall. The CH-53D's cargo hold measures 30 feet (9 m) in length, 7.5 feet (2.3 m) in width, and 6.5 feet (1.9 m) in height. Insulation normally fitted to the walls and ceiling to reduce noise levels inside the cabin has been removed from this aircraft. (Don Hinton)



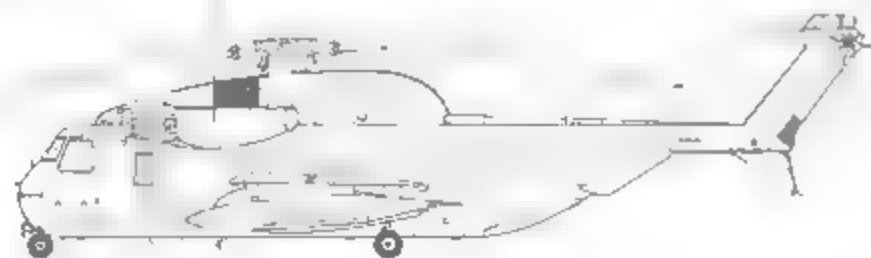
# RH-53D Sea Stallion

Beginning in September of 1973, Sikorsky turned out 30 examples of a purpose-built Airborne Mine Countermeasures (AMCM) version of the CH-53D. The RH-53D Sea Stallion was optimized to tow mine heavy countermeasures sleds, which weighed approximately 6000 pounds (2727 kg). Compared to the earlier RH-53A, the newer model featured a strengthened airframe, a stronger towing winch, and a cargo hook rated at 12.5 tons (11.3 MT). Two 3925 shp General Electric T-64 (GE-413) turbo-shaft engines originally powered the RH-53Ds, however, these were later replaced by 4380 shp T-64-GE-415 powerplants.

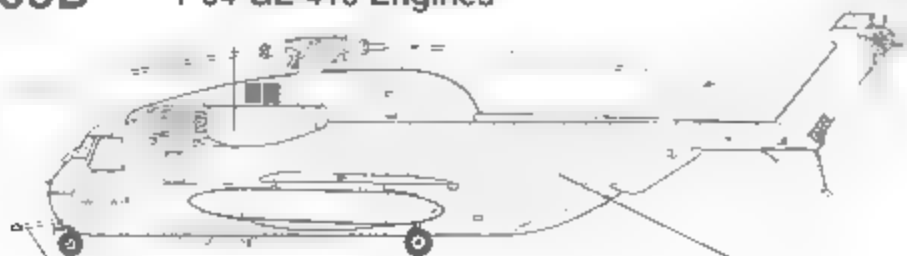
A variety of towed countermeasures devices have been used by AMCM helicopters. The Mk 103 counters moored mines by severing their tethers, allowing them to surface and be destroyed by gunfire. The Mk 104 uses a water-driven noisemaking system to cause the detonation of more sophisticated acoustically triggered mines. The Magnetic Orange Pipe (MOP) device, designated AN/SPU-1W, is another acoustic sweeper available to the Sea Stallion. An RH-53D can tow a string of MOPs to counter mines 'smart' enough to allow the passage of some ships in a convoy before being triggered by a trailing vessel. The Edo Mk 105 sled is employed for detonating magnetic influence mines triggered by the metal hulls of ships. This device can replicate various magnetic signatures and is powered by a gas turbine engine mounted on twin hydrofoil floats. Fitting acoustic equipment to the Mk 105 sled created the Mk 106. The helicopter may also deploy the Westinghouse AN/AQS-14 towed minehunting sonar system.

Production of the RH-53D – and all first-generation H-53s – ended with the delivery of six Sea Stallions to Iran, then a close ally of the US, in 1976 and 1977. Despite the upheaval of the Iranian Revolution and the long war with Iraq, several of the Iranian machines were still operating into the late 1980s. There is no doubt the Iranians salvaged spare parts from the US RH-53Ds abandoned at the *Desert One* site in 1980.

## CH-53D T-64-GE-413 Engines

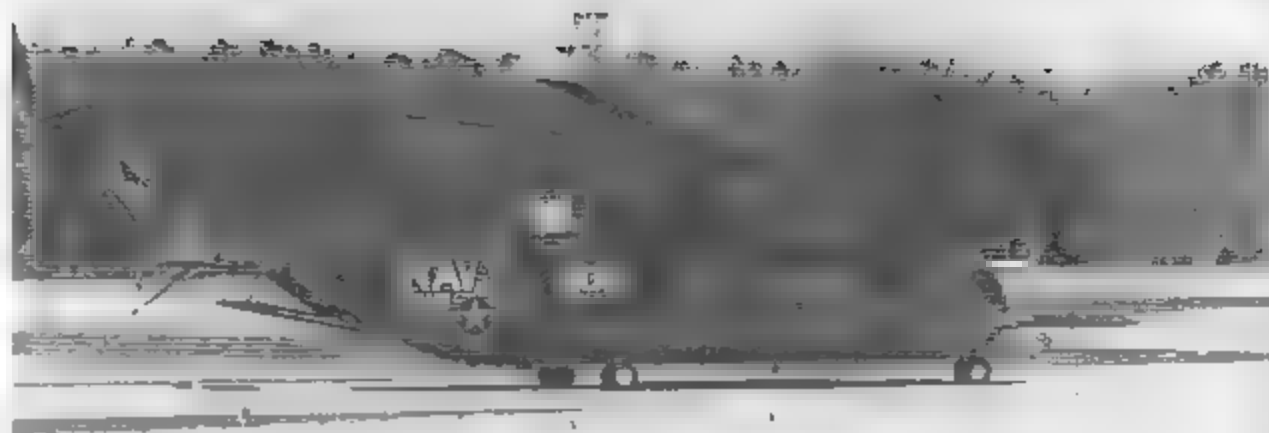


## RH-53D T-64-GE-415 Engines



Rear-View Mirrors (2)

Strengthened Airframe



An RH-53D Sea Stallion (BuNo 158754), code NW-604, taxis at NAS Atlanta, Georgia, in March of 1989. The helicopter was assigned to HM-18 at NAS Norfolk, Virginia. Minesweeping gear protrudes from the Sea Stallion's aft cargo doorway, while a rescue hoist is placed above the starboard crew entry door. The Squadron transferred to NAS Alameda, California, in 1990 and transitioned to the MH-53E Super Stallion in mid-1993. (Frank Miranda)

This RH-53D, DH/432 (BuNo 158686), was assigned to HM-12 at NAS Norfolk, Virginia. RH-53s were equipped with small rearview mirrors mounted under the nose to allow flight crews to monitor the towing process. The Sea Stallion is finished in overall gloss Engine Gray (FS16081) with a White edged Red lightning bolt on the port 500 gallon (1900 L) drop tank. (Nick Waters III)



## Operation EAGLE CLAW

The deterioration in US-Iranian relations following the revolution in January of 1979 culminated that November, when Iranian students seized the US Embassy in Tehran and took 66 Americans hostage. US military staffs soon began planning a mission to rescue the hostages, despite the great obstacles faced. These included penetrating thousands of miles unseen into Iran, infiltrating a capital city seething with anti-US sentiment, successfully storming the embassy compound, and getting themselves and the rescued hostages out of Iran.

The rescue mission – Operation EAGLE CLAW – was under the overall command of General James Vaught. This operation would use RH-53D Sea Stallions flown from an aircraft carrier to a staging area in central Iran, codenamed *Desert One*. The helicopters would meet Army Delta Force commandos under Colonel Charles Beckwith, who were flown in by MC-130E COMBAT TALONS from the Omani island of Masirah, accompanied by EC-130s carrying fuel bladders to refuel the RH-53Ds. The helicopters would fly Delta Force to the outskirts of Tehran, where the soldiers would drive into the Embassy and Foreign Ministry buildings to free the hostages. The Sea Stallions would then fly the Americans from the Embassy to Manzariyeh air base, located approximately 50 miles (80 km) southwest of Tehran. The rescue forces and the freed hostages would be picked up at Manzariyeh by C-141 Starliners. The helicopters would be abandoned in place.

The eight RH-53Ds assigned to EAGLE CLAW were in place aboard the carrier NIMITZ (CVN-68) in the Indian Ocean in January of 1980. The Sea Stallions were painted overall Desert Sand (FS30279) with no markings. The Engine Air Particle Separator (EAPS) filters were removed from the engine intakes – despite the desert environment – to reduce weight and provide a degree of extra power.

The mission began on the evening of 24 April 1980, when the RH-53Ds were launched from the NIMITZ. Several hours into the operation, the crew of *Bluebird 6* was forced to land due to a loss of nitrogen pressurization in a main rotor blade, which indicated imminent failure of this part. The Sea Stallion was abandoned and the crew with their classified materials was picked up by another RH-53D. An unexpected *hubbub* – a cloud of suspended dust – drastically cut visibility for the low flying helicopters. A second RH-53D was forced to return to the NIMITZ due to a disabled reference gyro, which essentially blinded the crew. The six remaining Sea Stallions arrived at *Desert One* behind schedule, with the C-130s and Delta Force awaiting them.

One of the remaining RH-53Ds lost a hydraulic system on the way to *Desert One*, which could not be repaired on site. This reduced the force to five helicopters – one below the minimum for taking Delta Force and the hostages out. The mission was cancelled and the various forces prepared to return to their staging bases.

During the confusion of aircraft running their engines and churning up dust, a hovering RH-53D flew into a fuel-laden EC-130. Both aircraft exploded with the burning fuel and ammunition adding to the inferno. Three crewmen aboard the Sea Stallion and five on the EC-130 were killed. The remaining personnel boarded the C-130s to fly out of *Desert One*, abandoning the RH-53Ds intact with classified material onboard. The Iranians later displayed the charred corpses before returning them to US control.

The *Desert One* disaster cost the US eight lives, national prestige, and an opportunity to end the hostage crisis. The lessons learned from EAGLE CLAW were invaluable in shaping future US special operations planning.

## RH-53D Operations

The RH-53D's first operational use was Operation NIMBUS STAR, the effort to clear the Suez Canal of mines in 1974. The helicopter carriers INCHON (LPH-12) and IWO JIMA (LPH-2) supported this operation.

A second mine countermeasures squadron, HM 14, was formed in 1978. Aircraft from this unit were deployed to the Middle East in early August of 1984 when Operation INTENSE LOOK was mounted after mines – suspected to have been laid by Libya – began appearing in the Red Sea and Suez Canal. On 20 September of that year, days after the end of INTENSE LOOK, RH-53Ds still in the area were used to evacuate the injured after a terrorist truck bomb destroyed the US Embassy Annex in Beirut, Lebanon.

In the summer of 1987, RH-53Ds were again deployed to the Middle East as part of Operation EARNEST WILL – the escort of US-flagged Kuwaiti oil tankers through the war-torn Persian Gulf. Shipping in the Gulf had been subject to attacks from both aircraft and surface vessels, but it was a hidden danger which awaited the first US-escorted convoy. Days into the first run, the tanker SS BRIDGETON was damaged by multiple mine hits. Although the huge ship was not in danger of sinking, this occurrence spotlighted a general weakness in US minehunting and sweeping capability. No minesweeping vessels were on hand in the region and the few older ships that were still in commission could not reach the Gulf for some time. In order to provide some MCM capability in the short term, eight RH-53Ds were flown to

## Operation EAGLE CLAW





Diego Garcia aboard USAF C 5s. The USS GUADALCANAL (LPH-7) transported the helicopters from the Indian Ocean base and sailed north to the Gulf where the Stallions cleared the shipping lanes, while retaliatory strikes were staged against Iranian minelayers and bases.

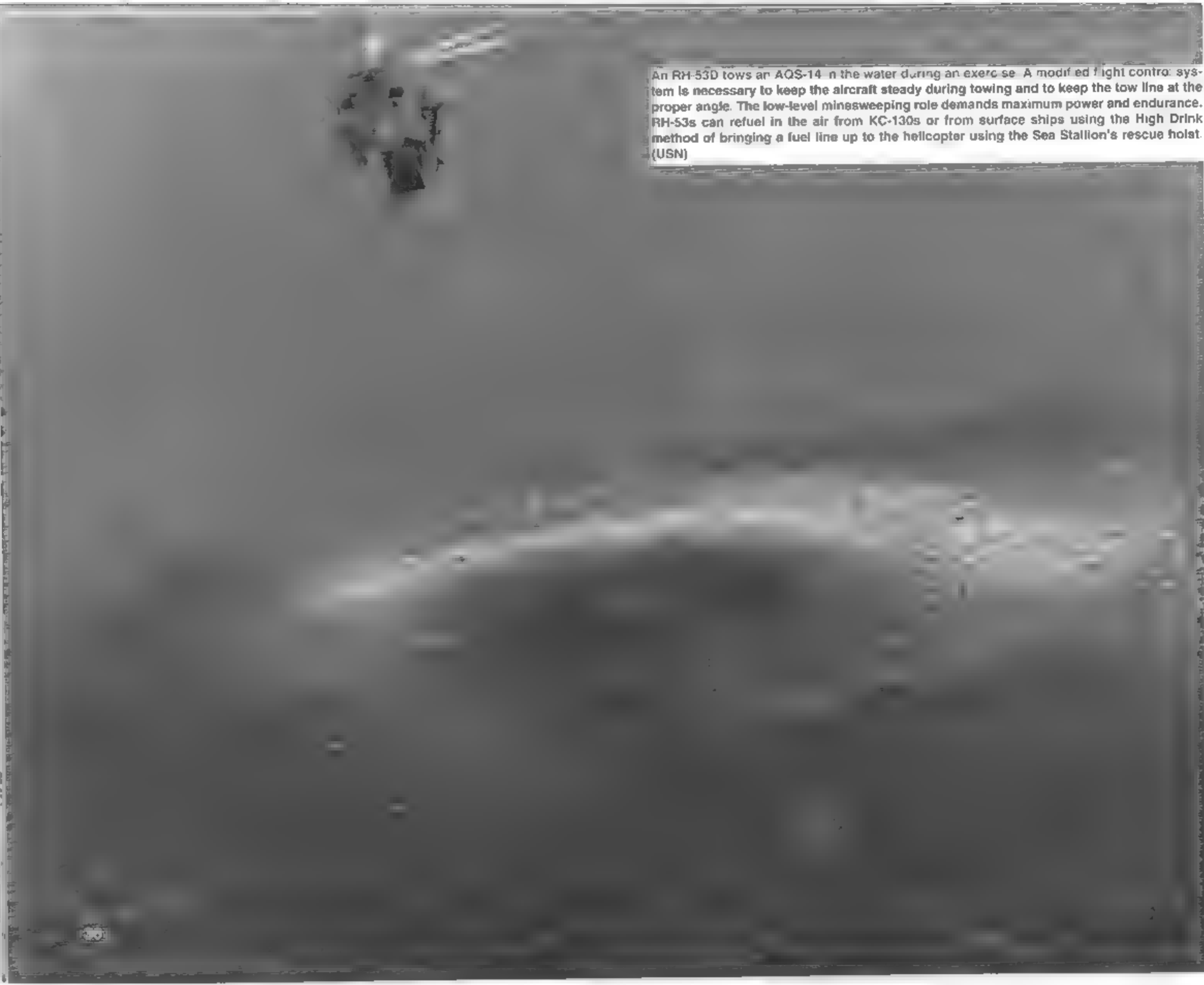
The RH 53D was phased out of front-line use by 1990, after the MH-53E had become available. At least seven D models were transferred to the USMC Reserve to equip HMH-772, while two USN Reserve squadrons took the other surviving RH-53Ds. The reserve AMCM units later received MH 53Es, but this was a short lived arrangement, since both squadrons were later deactivated. On 1 May 2000, a dozen RH-53Ds were at AMARC and at least two others have been preserved in museums.

(Below) This Sea Stallion is releasing a Westinghouse AQS-14 towed minihunting sonar vehicle. The AQS-14 detects mines under the surface and marks their position for later destruction. The RH-53D's rear ramp is equipped with a frame to prevent towlines from accidentally striking the aircraft. The trim on the 500 gallon drop tank is Red.



(Above) An HM-14 RH-53D displays the original high visibility markings applied to US Navy Sea Stallions on Airborne Mine Countermeasures (AMCM) duties. The stallion's head painted on the drop tank was Red with White trim. HM-14 operated from NAS Norfolk in support of the Atlantic Fleet. (USN)



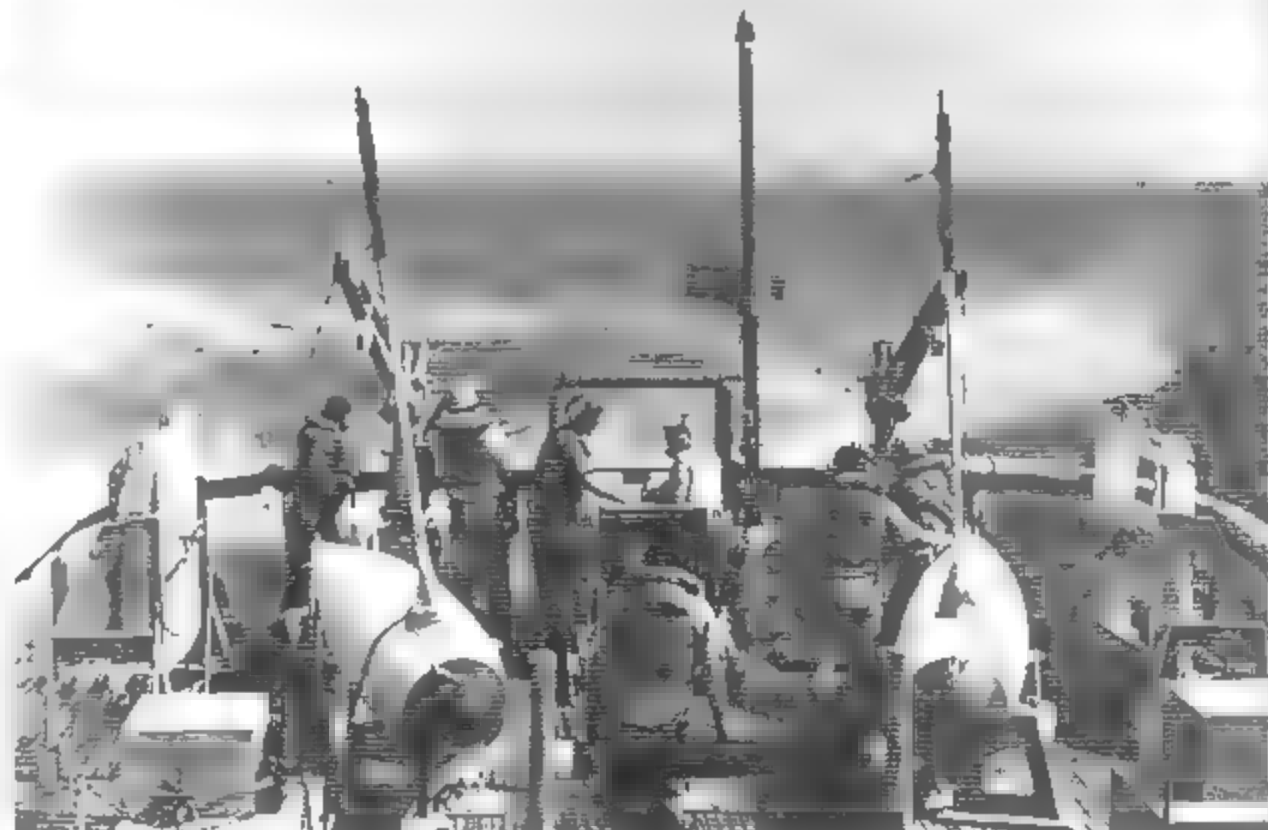
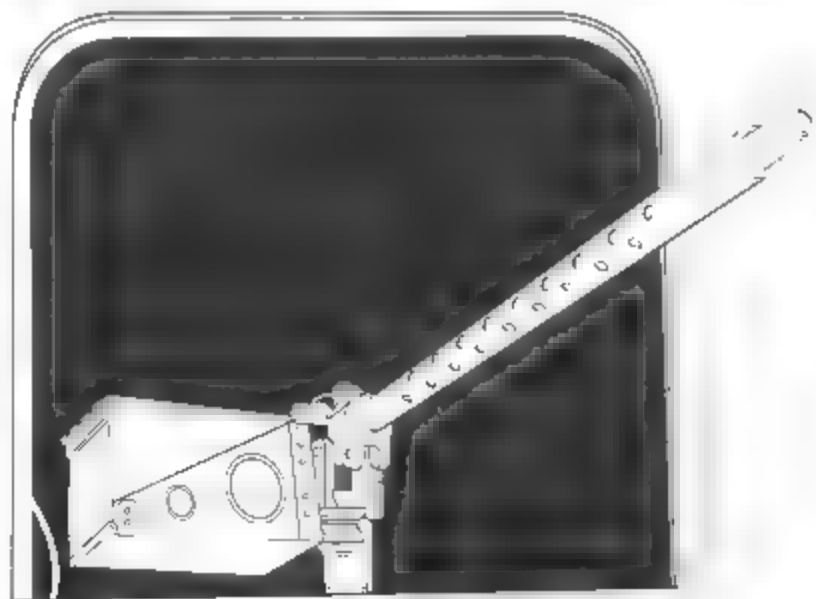
A grainy, black and white aerial photograph showing a helicopter towing a mine sweeper aircraft in the water. The helicopter is positioned in the upper left, and the mine sweeper is in the center. The water surface is dark with some lighter patches. The text is located in the upper right corner of the image.

An RH-53D tows an AQS-14 in the water during an exercise. A modified flight control system is necessary to keep the aircraft steady during towing and to keep the tow line at the proper angle. The low-level minesweeping role demands maximum power and endurance. RH-53s can refuel in the air from KC-130s or from surface ships using the High Drink method of bringing a fuel line up to the helicopter using the Sea Stallion's rescue hoist. (USN)



RH-53D (BuNo 158683) was the second example off the Sikorsky production line. After use in the minesweeping role by the Navy this Sea Stallion flew in the transport role with HMH-772 Det 2, a Marine Reserve unit at NAS Alameda, California. The RH-53D is finished in overall Light Ghost Gray (FS36375) and displays an additional US national insignia on the drop tank. The Squadron previously flew CH-53As before their replacement with D models. (Joe Michaels)

## .50 Caliber (12.7mm) Machine Gun



Two RH-53Ds fly near a support ship while on a minesweeping exercise. Two Mk 103 contact mine tether cutters are assembled on the ship's deck awaiting pickup by the helicopters. The RH-53D was similar to the Marines' CH-53D, but incorporated more powerful engines, a rescue hoist, and the minesweeping features of the interim RH-53A. These Sea Stallions were the last twin-engine H-53s built, since Sikorsky began developing the three-engine H-53E series during the early 1970s. (USN)

# Export Stallions

## CH-53G

The largest foreign operator of the Stallion is the German Army. After evaluating several types (including the CH-54 Skycrane) during the 1960s, the West German Army selected the CH-53, and a licensed production agreement was drawn up between Sikorsky and VFW-Fokker. Two US-produced CH-53Gs – virtually identical to CH-53Ds – were completed in March of 1969, with an additional 20 US-made kits being assembled in Germany. Subsequent production shifted to Europe, with VFW-Fokker turning out 90 CH-53Gs for a total of 112 machines.

The German Army assigned the CH-53G to three *Heeresfliegerregimenten* (HFR, Army Aviation Regiments) for transport duties – one regiment to each of the three army corps. The three CH-53G regiments are HFR 15 at Rheine-Bentlage (I Corps, northern Germany), HFR 25 at Laupheim (II Corps, western Germany), and HFR 35 at Mendig (III Corps, southern Germany). The Germans assigned the helicopters to airmobile operations, transporting troops and equipment to various battlefield sectors. German troops conducted frequent training in airmobile operations to prepare in the event of a Soviet-led invasion of Western Europe. The collapse of the Berlin Wall in November of 1989 heralded the end of the Cold War and the end of East-West tensions which had existed since the end of World War II in 1945.

Following the Persian Gulf War in 1991, the United Nations leased CH-53Gs to ferry inspec-

The first CH-53D/G (84+01) wore both West German markings and the US Navy BuNo 154885. The Iron Cross and the numbers flanking it are black with white trim. This Sea Stallion has been fitted with the external tank hardware, although the tanks are not car-

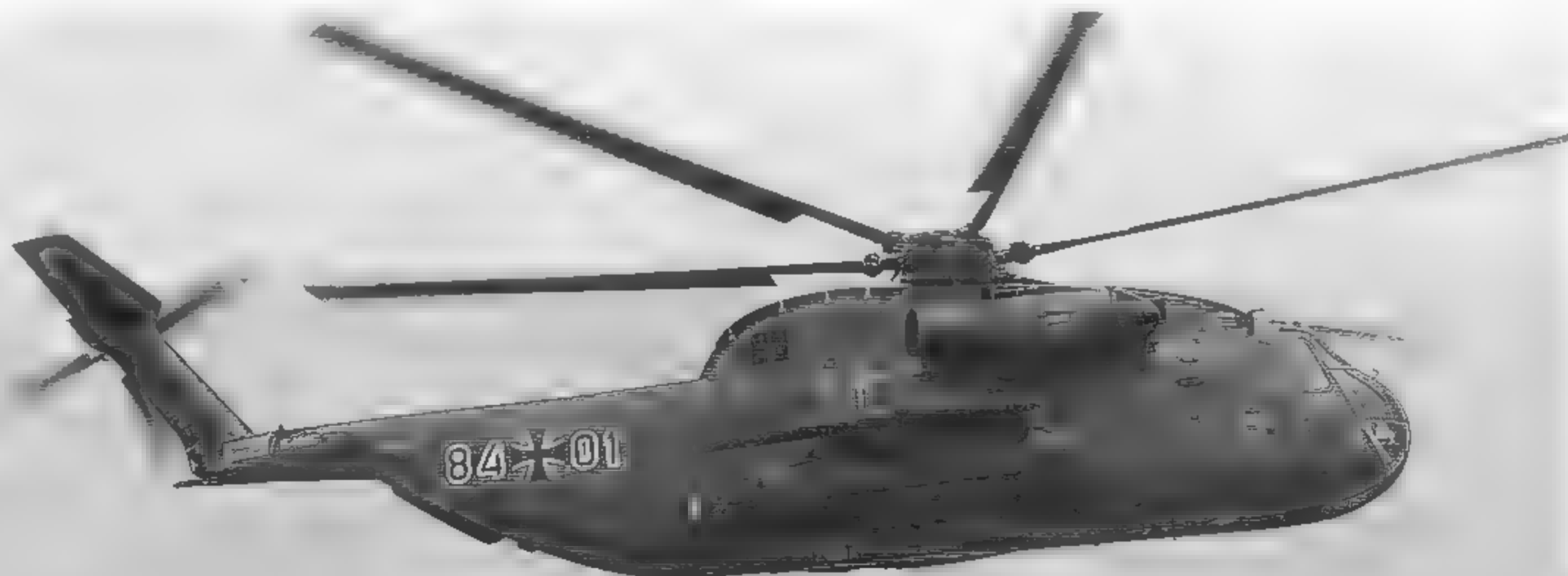
tors throughout Iraq during searches for unconventional weapons. These aircraft were finished in overall White with UN lettering, and the German Crosses were retained on the aft fuselage. A larger number of German Stallions have seen use with the NATO Stabilization Force (SFOR) in Bosnia, wearing SFOR markings on their sponsons and undersides, but retaining their standard paint scheme and Balkan Crosses.

## CH-53GS

Three decades after the CH-53G entered service, the type remains Germany's only heavy-lift helicopter. The original mission of providing airmobility to forces defending against a Warsaw Pact invasion has faded, however, new roles have appeared since German forces have begun engaging in foreign military operations for the first time since World War II. These operations include the NATO activities in the former Yugoslavia. The aging Sea Stallions must continue in service; however, steps are being taken to rework the airframes and install new systems.

Approximately 20 aircraft will receive the 'full up' refit to CH-53GS standard, which includes night vision goggle compatible cockpit lighting, Israeli and US warning and countermeasures systems, and outrigger fuel tanks on the sponsons. The bulk of the CH-53G force will not receive these upgrades due to economic considerations, but will have their airframes structurally renewed.

ried. German CH-53Gs did not use external fuel tanks in service. (via Sikorsky/United Technologies)







(Above) CH-53G 84+86 was a later Sea Stallion built by VFW-Fokker with some components supplied by Sikorsky. The first two CH-53Gs were built in the US, followed by 20 Sikorsky-made kits assembled in Germany and 90 machines built entirely in Germany. (W. Stolze via JEM Aviation Slides)



(Below) This CH-53G, 85+08, was displayed at RAF Boscombe Down in June of 1992. The Sea Stallion features an unusual white undersurface to the normal Olivegreen (RAL6003/FS34082) overall finish. The white title HEER on the sponson is German for Army. (Nick Challoner)

(Above) This CH-53G (84+05), assigned to Heeresfliegerregiment (Army Aviation Regiment) 35 at Mendig, appeared in a special anniversary scheme in 1987. The side striping is (from top) black, red, and yellow, trimmed in white. The white lettering on the nose reads: 30 Jahre Heeresflieger Mendig (30 Years of Army Aviation in Mendig). (W. Stolze via JEM Aviation Slides)





Austria operated two S-65-Öes – export versions of the CH-53D – primarily for mountain rescue and disaster relief. Aircraft 5L-MA was the first Sea Stallion supplied to the Austrian Luftstreitkräfte (Air Force); the other machine was coded 5L-MB. The nose and upper fuselage panels were painted Orange. (via Joe Michaels)



## S-65C-2/S-65-Öe

Aside from Germany, no other European nation currently operates the Stallion, although Austria did own a pair of S-65C-2s (locally designated S-65-Öes, Öe *Oesterreich* - Austria) for use in rescuing people injured or stranded in that country's mountain regions. These helicopters were passed along to Israel in 1981.

## S-65C-3/Ya'sur 2000

The first Middle Eastern customer for the Stallion was Israel, whose heavy-lift helicopter fleet consisted of French Aerospatiale Super Frelons until the late 1960s. The cutoff of French military aid around that time meant Israeli forces would increasingly be supplied with US-made aircraft, including S-65C-3s delivered from 1969. Often incorrectly identified as CH-53Ds, these aircraft have many Super Jolly features, such as refueling probes for tanking from IDF/AF (Israel Defense Force/Air Force) KC-130s. Additionally, it is believed that at least a small number of Israeli S-65s were fitted out for the collection of electronic intelligence (ELINT).

On 26 December 1969, Israel's technical intelligence on its Arab adversaries received a boost when S-65s brought back a Soviet-made P-12 (NATO codename *Spoon Rest A*) mobile SAM (Surface to Air Missile) radar installation. The radar had been supplied to Egypt, but an Israeli commando raid succeeded in capturing one along the Gulf of Suez. Possession of an actual set allowed a thorough study to be made and countermeasures to be devised.

The 1973 Yom Kippur War saw the S-65s providing heavy air mobility to the hard-pressed Israeli forces during their fight on multiple fronts. Nearly a decade later, S-65s supported the Operation *Pit Ach Lior* GALILEE invasion of Lebanon in 1982, bringing vehicles, supplies, and troops northward during the Israeli advance on Beirut.

Having been in service for over a quarter-century, the Israeli Stallions were put through the *Ya'sur* (Albatross) 2000 refit by MATA Helicopters – a subsidiary of Israel Aircraft Industries Ltd. – in the 1990s, being structurally refurbished and fitted with new avionics and countermeasures/warning systems. The Israelis added to their Sea Stallion fleet by receiving ten ex-USMC CH-53As after the Gulf War, which were later brought up to Israeli standard.

On 4 February 1997 a pair of *Ya'sur* 2000s came to grief while transporting troops to Lebanon, with the helicopters colliding at night over She'ar Yashuv. None of the 73 persons (eight crew and 65 troops) aboard the two Sikorskys survived, making the accident the worst Israeli military air disaster ever. Ironically, this tragic distinction was formerly held by a Stallion crash – which killed 54 – on 10 May 1977.

S-65-Öe, 5L-MA, spins its rotors while on a visit to RAF Greenham Common, England during the 1970s. Austria's Sea Stallions were finished in overall Olive Green (FS34082) with Red and White insignia and White lettering. After 11 years of service, Austria sold both S-65-Öes to Israel in 1981. (Robert M. Robinson)

## CH-53E Super Stallion

Sikorsky engineers were already planning a new three-engined version of the S-65 series as early as 1964. Initial planning was for a commercial variant with a new pressurized fuselage seating approximately 70 passengers and power provided by three General Electric T64 turboshaft engines. This proposal never made it to the hardware stage.

The concept of a three-engined model was hardly dead, by the late 1960s, the need was seen for a naval crane helicopter able to transfer heavy loads between land bases or supply ships and combatants at sea. The Marines were also interested in a transport helicopter which could carry more types of heavy equipment during amphibious operations.

An effort to combine this need with an Army program to replace the CH-54 came to naught; however, Sikorsky was well along with the development of a new Stallion derivative for the role. The company's YCH-53E proposal was basically a CH-53D with a third T64-GE-415 engine, a seven-blade main rotor, and a tail rotor tilted 20° to port. Additionally, the fuselage would be stretched by 10 feet 10 inches (3.2 m) and enlarged sponsons fitted to hold 387 gallons (1471 L) more fuel.

Sikorsky tested the triple-engined configuration on a non-flying testbed, and the first flight test airframe took to the air on 1 March 1974. Two YCH-53Es were produced, one of which was soon lost in an accident. The original low-mounted tailplanes were eventually scrapped in favor of a single surface mounted higher up on the tail rotor pylon, this being a feature of the two preproduction aircraft which flew from 1975. Production helicopters are powered by three 4380 shp General Electric T-64-GE-416 turboshaft engines.

The CH-53E Super Stallion was the first pure transport version of the H-53 in US service to have a refueling probe, allowing for rapid self-deployment over long distances. The CH-53E, like other Stallions, can also be carried aboard C-5 Galaxy transports.

The Marines have ended up being the principal CH-53E user, buying well over 100 heli-

copters to replace older, less capable Sea Stallions by 1993. Five heavy-lift squadrons have been equipped with the type, and the Corps intends to buy over 200 total aircraft. The Super Stallion was first used in a combat environment during the Lebanon operation, when CH-53Es were used to bring howitzers to the USMC base at Beirut Airport in 1983.

On 2 January 1991, while war clouds were gathering over the Persian Gulf, a pair of Super Stallions were flown off amphibious ships in the Arabian Sea, bound for Mogadishu, Somalia, to evacuate US diplomats and other non-combatants. Operation EASTERN EXIT ended on 5 January, but CH-53Es would be seen over Somalia again.

Although it was never carried out, a USMC amphibious attack into Kuwait during the ground war phase of DESERT STORM was always a possibility, and this served to tie down large numbers of Iraqi troops far from the main Coalition assault farther to the west. A force of amphibious assault ships was on hand in the Gulf for just such an operation, and two shipboard composite HMM squadrons flew Super Stallions alongside CH-46 Sea Knights, AH-1W Super Cobras, and UH-1 'Hueys.' HMM-461, -464, -465, and -466 also deployed the CH-53E.

When Operation PROVIDE HOPE got underway in Somalia on 9 December 1992, CH-53Es flying from the task force offshore were part of the initial heliborne landing at the airport at Mogadishu, bringing men and supplies ashore amid considerable media coverage. The Super Stallions would soon be operating throughout the country, supporting the Marine contingent and helping deliver relief supplies. On 25 March 1994, when the ill-fated mission came to a close, CH-53Es helped bring out the last Marines.

Although most use of the 'Echo' has been by the Marines, the original Navy vertical resup-

The two YCH-53E prototypes featured low-mounted tailplanes, which were replaced on production Super Stallions by a more effective gull-wing unit mounted higher up on the tail. The cylindrical cap on top of the main rotor hub fairing – painted red – was an instrument housing not found on production machines. The instrumentation boom – also painted red – was mounted on the nose where refueling probes were installed on production machines. (Sikorsky)

## CH-53D Sea Stallion

Six-Bladed Rotor



## CH-53E Super Stallion

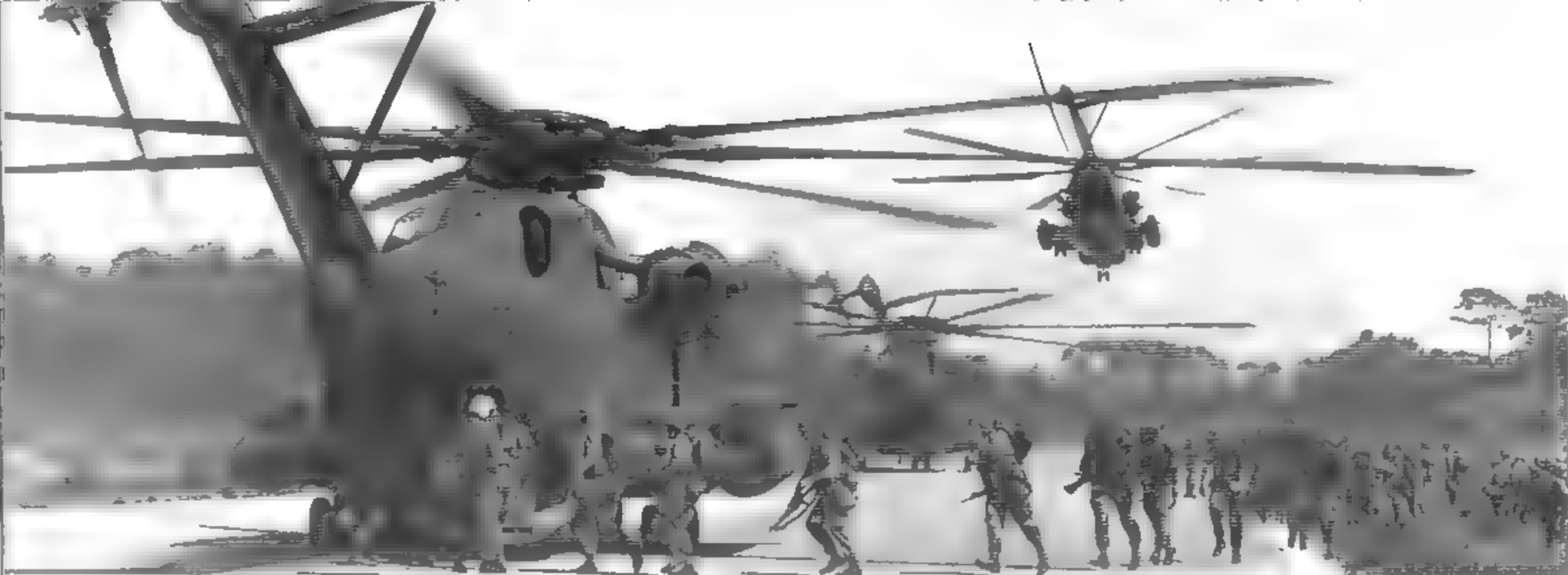
Third Engine Installed in Upper Fuselage

Seven-Bladed Rotor



Enlarged Tail Pylon





Marines line up to board a CH-53E under the guidance of its crew chief. The Super Stallion can hold 55 troops, although the Boeing Vertol CH-46 Sea Knight is primarily tasked with the troop transport mission. CH-53D/E detachments are used to form the heavy lift ele-

ment role has hardly been forgotten. HC-1 at Naval Air Station (NAS) North Island, California operated CH-53Es and assisted during the major earthquake that struck that area in October of 1989. By late summer of 1992 the squadron had relinquished its Super Stallions. Helicopter Composite Squadron HC-4, based at NAS Sigonella, Sicily, deployed aircraft to Egypt and Saudi Arabia during the Gulf Crisis to resupply aircraft carriers. The Squadron also took part in Operation PROVIDE COMFORT, the effort to bring relief supplies to Kurdish refugees in northern Iraq following an unsuccessful revolt against Saddam Hussein. Flying from Turkey, HC-4 aircraft were joined by those of HMM-264(C). Finally, HC-5 flew Pacific missions with CH-53Es until US forces finally left the Philippines.

Air Force MH-53s are not the only Stallions to be used for combat SAR; the Marine Corps has used the CH-53E as the centerpiece of the Tactical Recovery of Aircraft and Personnel (TRAP) mission. A TRAP Force from the amphibious assault ship USS KEARSARGE (LHD-3) was responsible for bringing USAF Captain Scott O'Grady out of Bosnia-Herzegovina on 8 June 1995, after O'Grady's F-16C Falcon was lost to an SA-6 SAM six days earlier. Although the pilot had successfully ejected, no word was heard from him for days, fueling speculation he was a prisoner of the Serbians. Finally, in the early morning hours of 8 June – after days of hiding and subsisting on little more than insects and water – O'Grady managed to make contact with an F-16. After authentication procedures had verified O'Grady's identity, rescue forces were soon in motion. Leaving the KEARSARGE before dawn were two CH-53Es of HMM-463 detached to HMM-263 of the 24th Marine Expeditionary Unit (Special Operations Capable). The Super Stallions were escorted by two AH-1Ws similarly detached to HMM-263 from HMLA-269 and a pair of AV-8B Harriers. Several dozen support aircraft

ments of composite Marine Medium Helicopter Squadrons (HMM) deployed aboard amphibious assault ships. (Sikorsky)

from Italian bases were also airborne, including F-16s, Electronic Warfare (EW) aircraft, and backup Combat Search and Rescue (CSAR) assets. Infiltrating Bosnia at low level, the TRAP force's Super Cobras located O'Grady and the CH-53Es were brought into a clearing for the pickup, one landing to disembark Marines to act as a security force, while the other crew brought O'Grady aboard. Heading out towards the Adriatic, now in daylight, the helicopters were soon to receive attention from antiaircraft defenses. Several shoulder-launched SAMs were fired at the US aircraft and the CH-53Es took some hits from conventional small arms, replying with fire from the door guns. The coast was safely reached and shortly afterward the TRAP force recovered aboard KEARSARGE, its mission accomplished.

O'Grady's rescue was not the first time a TRAP mission had been attempted over the region. On 4 September 1992, two Super Stallions from the IWO JIMA (LPH-2), with a pair of AH-1W escorts, had attempted to reach the wreckage of an Italian G-222 transport which had been shot down while attempting to land at Sarajevo. The helicopters encountered ground fire, but no pick-up was possible – as the transport's entire crew had been killed in the crash.

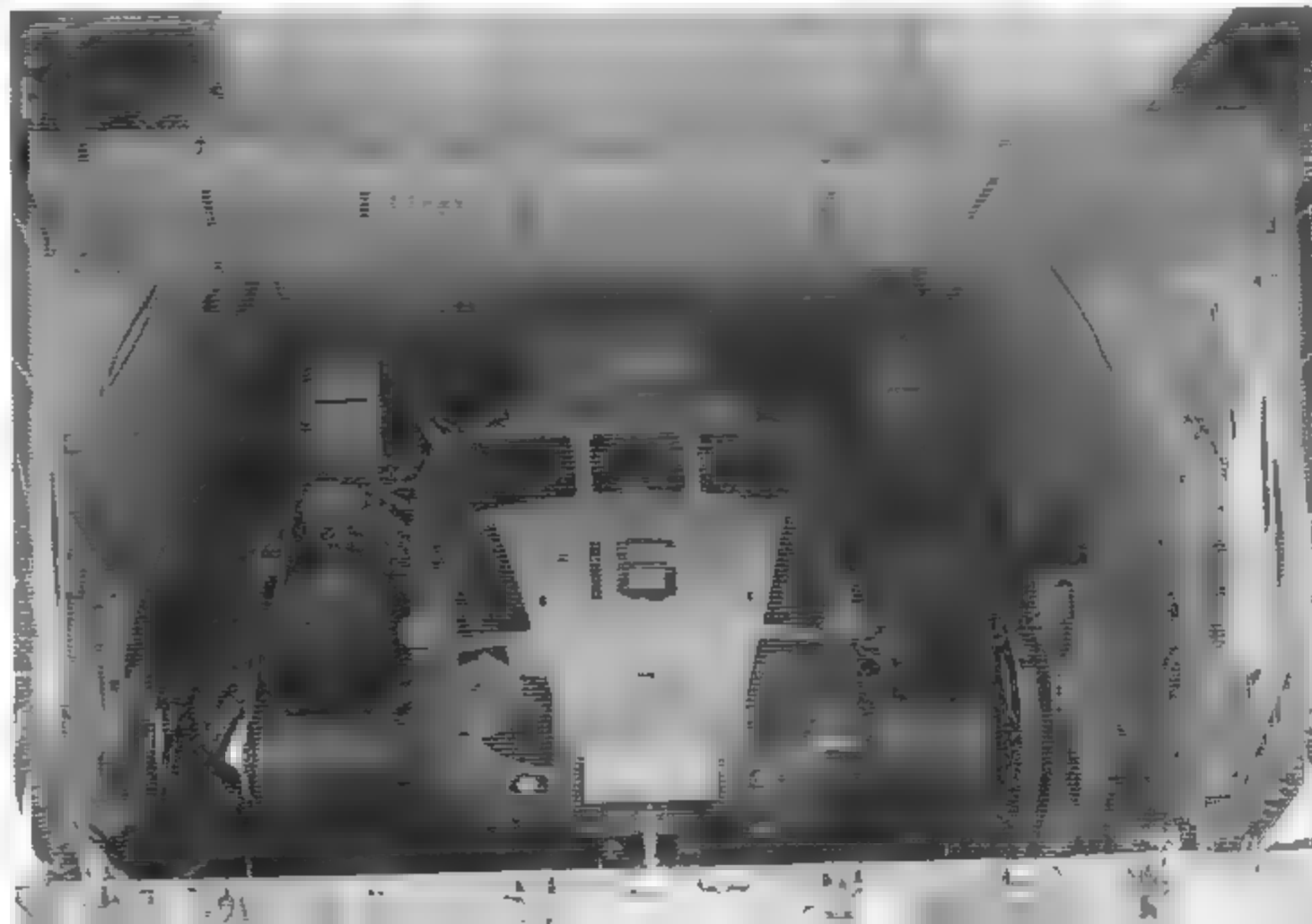
The CH-53E's prodigious weightlifting capability has made itself felt in many peacetime operations. One of the more unusual missions took place in the spring of 1992, when Super Stallions moved concrete blocks to redirect lava flows after the eruption of the Italian volcano, Mt. Etna. In the fall of 1999, CH-53Es based aboard the USS PELELIU (LHA-5) conducted humanitarian flights into East Timor, Indonesia.

Nine Super Stallions, retired to AMARC (Aerospace Maintenance and Regeneration Center) between 1995 and 1997, were still there in May of 2000.

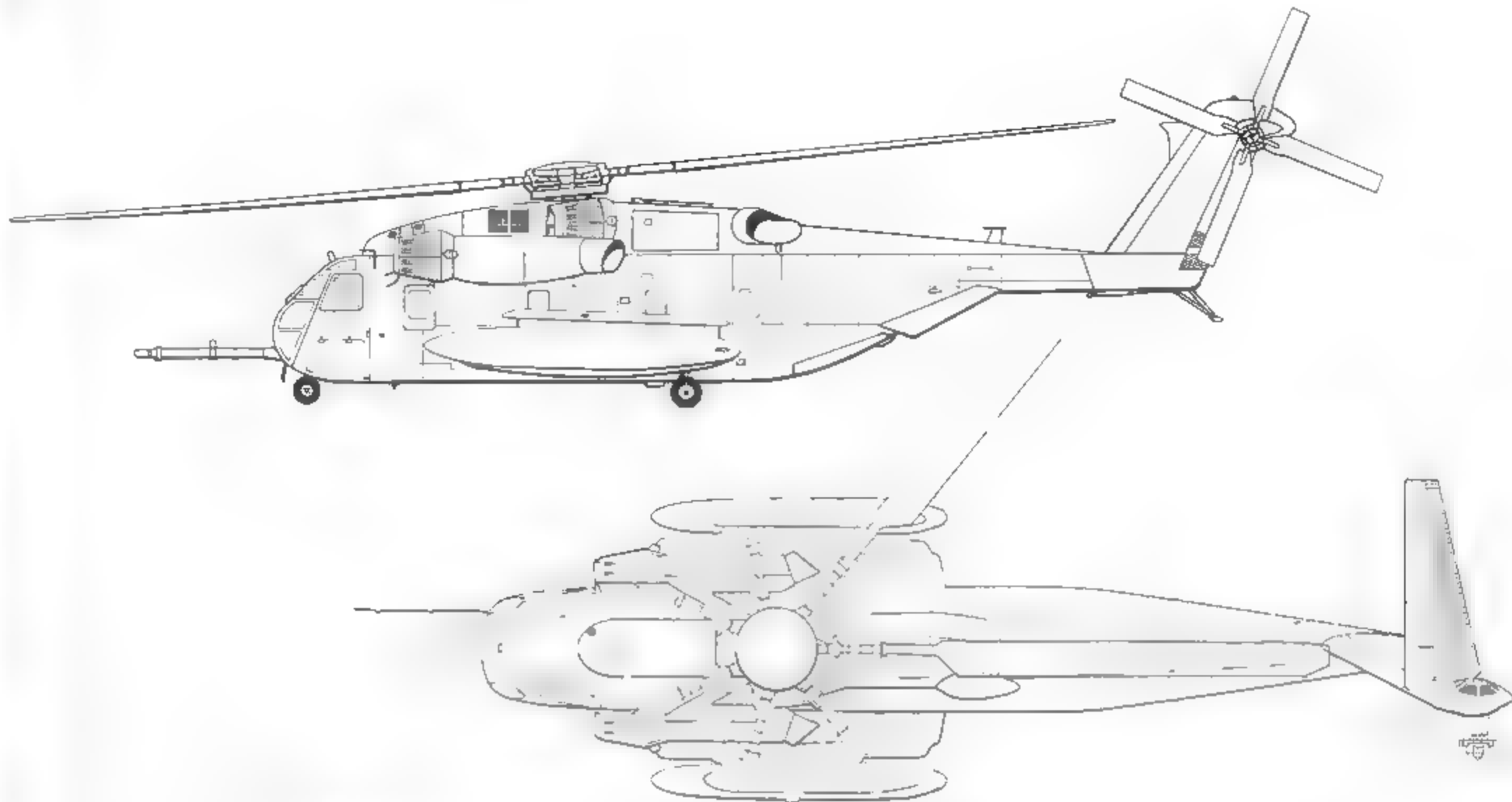


(Above) This CH-53E Super Stallion is parked on the deck of the amphibious assault ship USS GUAM (LPH-9) at the Southampton Docks, England, in June of 1994. The aircraft is finished in overall Marine Green (FS34097) with Black markings. Braces secure the seven folded main rotor blades to prevent them from excessively flapping in the wind. The GUAM and her sister ships in the IWO JIMA class are capable of carrying up to 11 CH-53s, while the larger TARAWA class amphibious assault ships can host up to 19 Sea Stallions. The white domed object placed below the flight deck is the 20mm Mk 15 Phalanx Close-In Weapon System (CIWS). The Phalanx is installed on US warships to shoot down enemy anti-ship missiles. (Nick Challoner)

(Right) A CH-53E Super Stallion assigned to HMH-461 is secured into the cargo hold of a US Air Force Lockheed C-5A Galaxy transport of the 68th Airlift Squadron. The main rotor assembly has been removed to allow the helicopter to fit within the C-5's cargo hold. With the main rotors and tail folded, the Super Stallion's length is reduced to 60 feet 6 inches (18.4 m) and its height reduced to 18 feet 7 inches (5.7 m). The Super Stallion's 650 gallon (2470 L) external fuel tanks have been placed above the sponsons for the flight inside the Galaxy's cargo hold. The C-5 delivered the CH-53E to Greece for participation in Exercise DYNAMIC MIX 2000. This NATO exercise, held during the spring of 2000, involved forces from 14 countries conducting live fire practice and learning to work under a joint command. (US Marine Corps Photo by Staff Sgt Craig Shell)





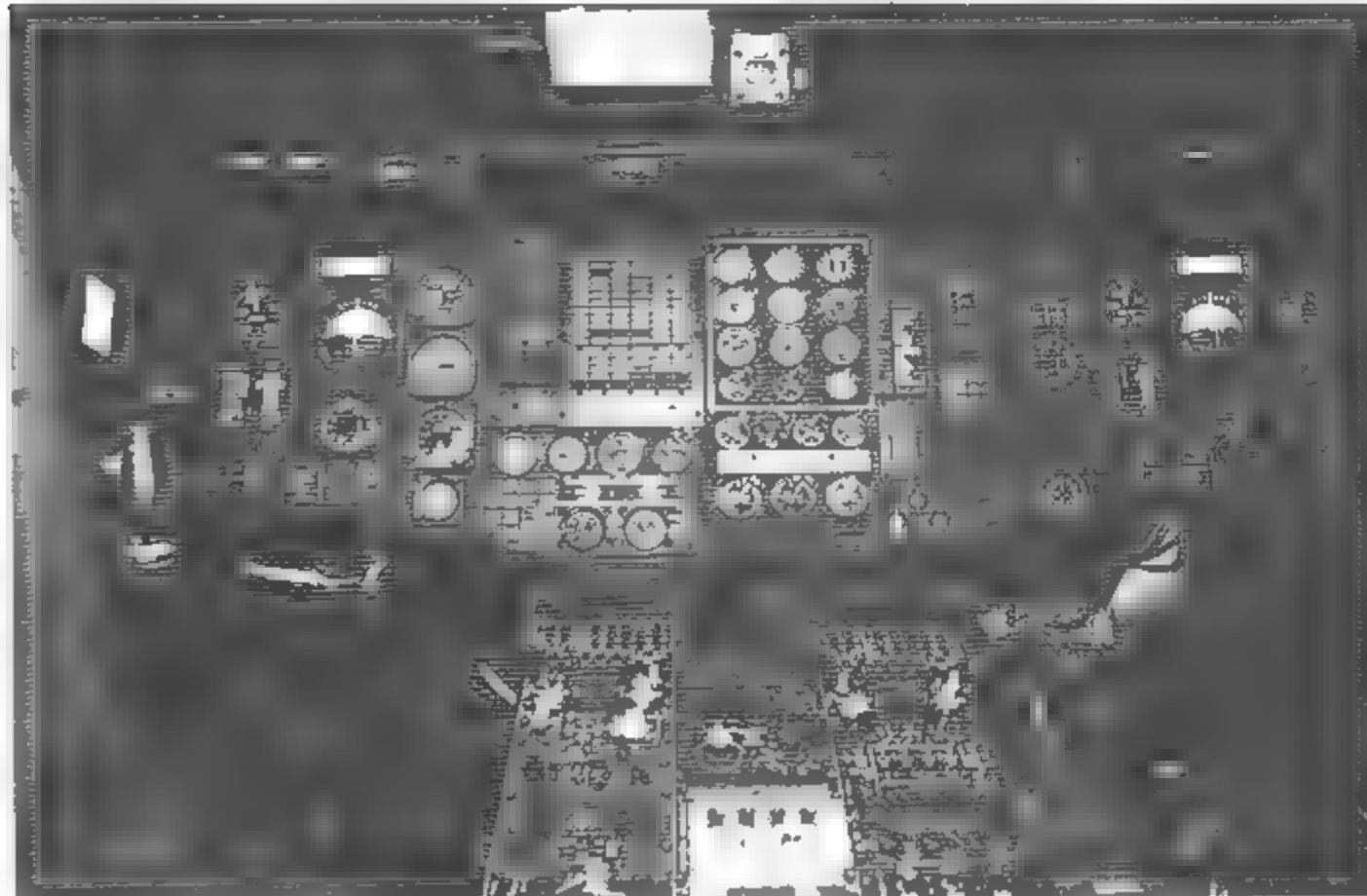


### **Sikorsky CH-53E Super Stallion Specifications**

**Main Rotor Span.....79 Feet (24 m)**  
**Fuselage Length.....73 Feet 4 Inches (22.4 m)**  
**Height.....29 Feet 5 Inches (8.8 m)**  
**Empty Weight.....33,228 Pounds (15,104 kg)**  
**Maximum Weight.....73,500 Pounds (33,409 kg) with External Load**  
**Power Plants.....Three 4380 SHP General Electric T-64-GE-416 Turboshaft Engines**  
**Armament.....None**  
**Performance**  
**Maximum Speed.....196 MPH (315.6 kmh) at Sea Level**  
**Service Ceiling.....18,500 Feet (5634.5 m)**  
**Range (Unrefueled).....499.3 Nautical Miles (575 Statute Miles/925.3 km)**  
**Crew.....Three**



(Above) Two CH-53E Super Stallions, each carrying a LAV-25 light armored vehicle slung externally, still possess enough speed to take fuel from a Lockheed KC-130 Hercules tanker. The refueling probes on the helicopters extend to take fuel from the tanker's drogue. Extreme care is required to keep the helicopter's rotors from striking the drogue. During the early 1980s, the USMC claimed that its Super Stallions, with KC-130 tanker support, could fly nonstop from Camp Lejeune, North Carolina, to Central America while carrying a LAV-25. This is a distance of approximately 1580 miles (2543.8 km). (Sikorsky)



(Above Right) The CH-53E's instrument panel contains three sets of engine instruments in the center, compared to two sets of instruments for the earlier twin-engined H-53 variants. The master warning panel placed left of the engine instruments indicates emergency or abnormal situations to the flight crew. Both the starboard-seated pilot and the port-located co-pilot have duplicate flight controls and instruments. The top row of flight instruments includes (L-R) airspeed indicator, attitude indicator, barometric altimeter (top), and rate of climb indicator (bottom). A navigation instrument is mounted just under the attitude indicator and the radar altimeter is located under the rate of climb indicator. The cyclic stick in front of the co-pilot's seat controls the helicopter's pitch and roll, while the collective stick beside the center console controls the

pitch. The master warning panel is located on the left side of the center console. The center console houses radio communications and navigation controls. Navigation system keypads are located at the front of the center console. (Sikorsky)



(Right) The CH-53E's aft cargo ramp is lowered to the ground by two hydraulic jacks and folds up for flight. The cabin measures 30 feet (9 m) long, 7.5 feet (2.3 m) wide, and 6.5 feet (1.9 m) high. Folding seats for 55 troops line the cabin walls. These seats lack the crash protection of the seats fitted to the CH-53D on page 32. Light blue insulation along the cabin walls and ceiling reduces noise inside the cabin. The cockpit access is through the forward cabin bulkhead, with the crew access door located to starboard immediately behind the cockpit. The interior of the CH-53E is painted Dark Gull Gray (FS36231). (Sikorsky)



A CH-53E lifts a General Motors of Canada LAV-25 light armored vehicle using two slings attached to lifting hooks on the helicopter's undersurface. The eight-wheeled LAV-25's combat weight is 28,340.4 lbs (12,882 kg) — no problem for the Super Stallion, which can carry 36,000 lbs (16,364 kg) externally. The CH-53E can transport most other pieces of Marine equipment, except tanks, internally or externally. (Sikorsky)



A pair of eyes decorate a CH-53E hovering above the deck of a helicopter carrier with an AM General M998 HMMWV (High Mobility Multipurpose Wheeled Vehicle) slung underneath. The 'Humvee' light cargo and troop carrier weighs 5200 lbs (2364 kg) — the CH-53E can carry two of these vehicles externally. (Stewart)

This CH-53E is equipped with two 650 gallon (2470 L) fuel tanks on sponson-mounted pylons. The Sea Stallion/Super Stallion fleet began in overall Field Green before progressing to the gray/green/black scheme in the early 1980s. During the 1990s, they were being refinished in an overall gray (FS36375) low visibility scheme. (Sikorsky)



## MH-53E Sea Dragon

The potential for using a derivative of the CH-53E as a replacement for the aging RH-53Ds was not lost on the USN. In December of 1981 a CH-53E (BuNo 161395) demonstrated the basic MH-53E configuration. This aircraft flew in a White/Light Gull Gray scheme; however, operational aircraft are finished in low-visibility colors. Sikorsky began turning out production airframes in the spring of 1986 and the name **Sea Dragon** was adopted. The MH-53E is distinguishable externally by its enlarged sponsons which provide 2578 gallons (9759 L) more fuel capacity for low-level towing operations. Internally, an updated autopilot is fitted.

HM-12 at NAS Norfolk, Virginia began receiving MH-53Es in April of 1987 and would train crews for two other squadrons. HM-15, which had been established in January of that year, was shifted to NAS Alameda, California in October for operations from the west coast. HM-14 at NAS Norfolk also converted to the new aircraft and took up the east coast mission.

HM-15 suffered the first loss of a Sea Dragon when one of its helicopters exploded during a training flight off the California coast in July of 1988, killing all eight crewmen aboard.

The Sea Dragon's baptism of fire came during Operation DESERT STORM. Iraq had laid hundreds of mines across the northern Persian Gulf to stymie the expected USMC amphibious assault against Kuwait. Although this attack was never carried out, Sea Dragon minesweeping was still necessary – both to keep the assault option open and to permit battleships to move within range of Iraqi forces in Kuwait.

The mine danger to Coalition ships was made all too evident on 18 February 1991, when the USS TRIPOLI (LPH-10) hit a mine while serving as an MH-53E base, blowing a large hole in the hull and rupturing her fuel tanks. The stricken helicopter carrier stayed on station for days afterwards, but Sea Dragon operations were later shifted to other ships, including the command vessel USS LA SALLE (AGF-3). Soon after TRIPOLI's misfortune, the Aegis cruiser USS PRINCETON (CG-59) also hit a mine, doing severe damage to the ship's structure. No ships were lost to Iraqi mines, but MCM forces were busy clearing the Gulf long after the end of DESERT STORM.

In 1992, an MH-53E made a 750-mile (1207.5 km) flight from the USN test facility at

Patuxent River, Maryland to West Palm Beach, Florida in just under five and a half hours, setting a new large helicopter record.

In 1996, the AMCM force gained a dedicated base ship with the recommissioning of the USS INCHON (MCS-12). The last of the IWO JIMA-class amphibious assault ships to remain in service, the INCHON was extensively modernized with specialized command and repair facilities to support MH-53E operations. The ship can also service MCM vessels.

In the fall of 1999, HM-14 deployed three Sea Dragons to NAS Quonset Point, Rhode Island to support salvage operations after the crash of EgyptAir Flight 990. The Boeing 767 had departed New York for Cairo when it plunged into the Atlantic Ocean. When the doomed airliner's flight data recorder was brought to the surface, an MH-53E transported the 'black box' from the USS AUSTIN (LPD-4) to the mainland for analysis.

HR-4 has used the Sea Dragon in the transport role and, in August of 1996, an aircraft from the Squadron lifted a 7000 lb (3181 kg) statue of Jesus to the top of a mountain in Sicily. This was not the first time such a mission had been carried out; in August of 1975, a CH-53D took a statue depicting the Madonna and Child to the summit of an Italian peak.

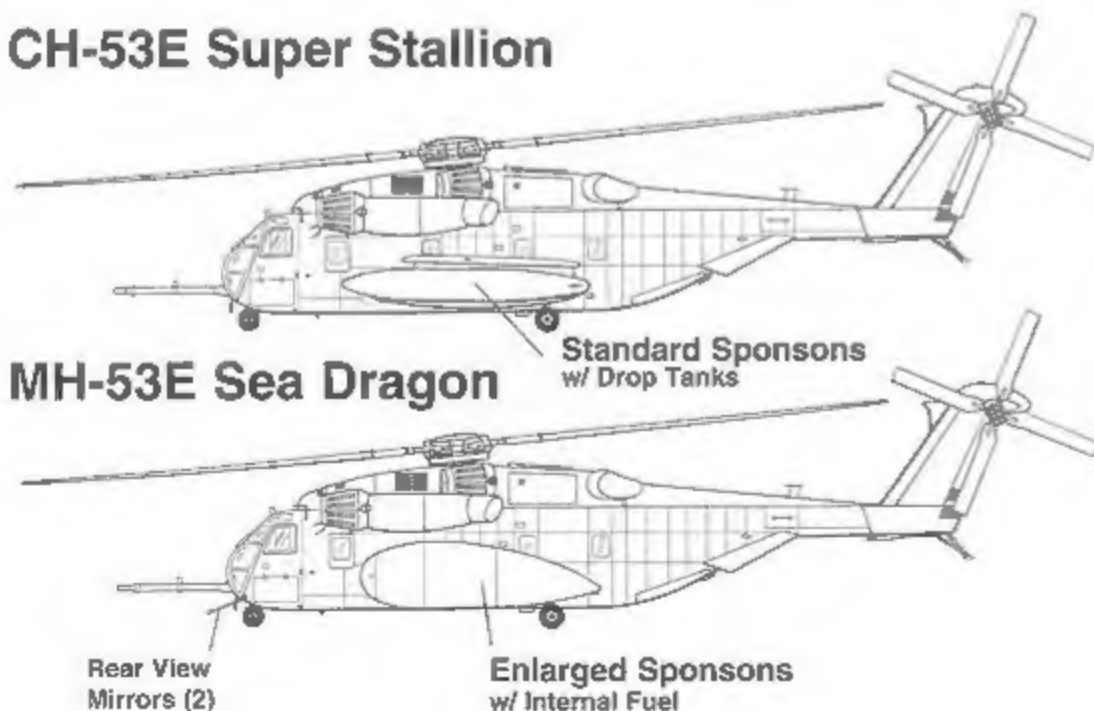
MH-53Es are being retrofitted with the 4750 shp General Electric T64-GE-419 turboshaft engine. The new engine provides increased power over the 4380 shp T-64-GE-416 originally fitted to MH-53Es. The T-64-GE-419's rating can be boosted to 5000 shp for a brief period during an emergency – such as the loss of another engine. Plans to retrofit the T-64-GE-419 to Marine CH-53Es have been frustrated by lack of funds.

Three Sea Dragons were stored at AMARC in May of 2000.

The MH-53E Sea Dragon Mine Countermeasures (MCM) aircraft features enlarged sponsons to hold 3200 gallons (12,113 L) of fuel. The Sea Dragon can fly for over four hours on internal fuel, although aerial refueling via the nose mounted refueling boom can extend this endurance. The MH-53Es are finished in overall flat Engine Gray (FS36081) with light gray markings. (Sikorsky)

## CH-53E Super Stallion

### MH-53E Sea Dragon







(Below) MH-53Es also perform Vertical Replenishment (VERTREP) duties, although these are usually tasked to the Navy's CH-53E Super Stallions. Deck crews prepare a pallet of cargo for lifting by an HM-14 Sea Dragon. The refueling probe has been removed from the nose; however, the nose-mounted rearview mirrors and the minesweeping frame in the cargo doorway are retained. VERTREP is also called Vertical On-board Delivery (VOD). (USN)



(Above) An MH-53E (HC/41) assigned to HC-4 'Black Stallions,' is parked on the ramp at RAF Mildenhall, England in May of 1995. The tips of the composite-skinned main rotor blades are secured to the fuselage with cables to prevent their free spinning in the wind. The Sea Dragons feature improved flight control systems and night/all-weather capability over the earlier RH-53D. The MH-53E is replacing the older Sea Stallion in the AMCM role. (Nick Challoner)

## S-80E

Sikorsky has proposed an export version of the CH-53E, designated S-80E. To date, no S-80Es have been built, and prospects for any sales look bleak, since most overseas users of heavy-lift helicopters have bought CH-47 Chinooks, while Germany and Israel have upgraded existing twin-engined Stallion models rather than buying new machines.

## S-80M

The S-80M is the export version of the MH-53E Sea Dragon Airborne Mine Countermeasures (AMCM) aircraft. The S-80M is essentially the same aircraft as the US Navy's MH-53E; however, the export aircraft is not equipped with an in-flight refueling probe. The Japan Maritime Self-Defense Force (JMSDF) purchased 11 S-80M-1s to replace Kawasaki-Vertol KV-107-II AMCM helicopters – license-built derivatives of the CH-46 Sea Knight – from 1991.





(Above) An HH-53B "Super Jolly Green Giant" of the Aerospace Rescue and Recovery Service prepares to bring aboard a downed airman within North Vietnam. The aircraft was armed with up to three 7.62mm Miniguns to suppress enemy defenses

(Below) An RH-53D Sea Stallion assigned to HM-14 skims the Iranian desert en route to the Desert One staging base on 24 August 1980. Three of the eight RH-53Ds assigned to Operation EAGLE CLAW suffered mechanical failures, forcing the hostage rescue mission to be aborted.



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